SPINMASTER

OPERATION, MAINTENANCE AND SERVICE MANUAL

550 & 950 SERIES

4-30-13

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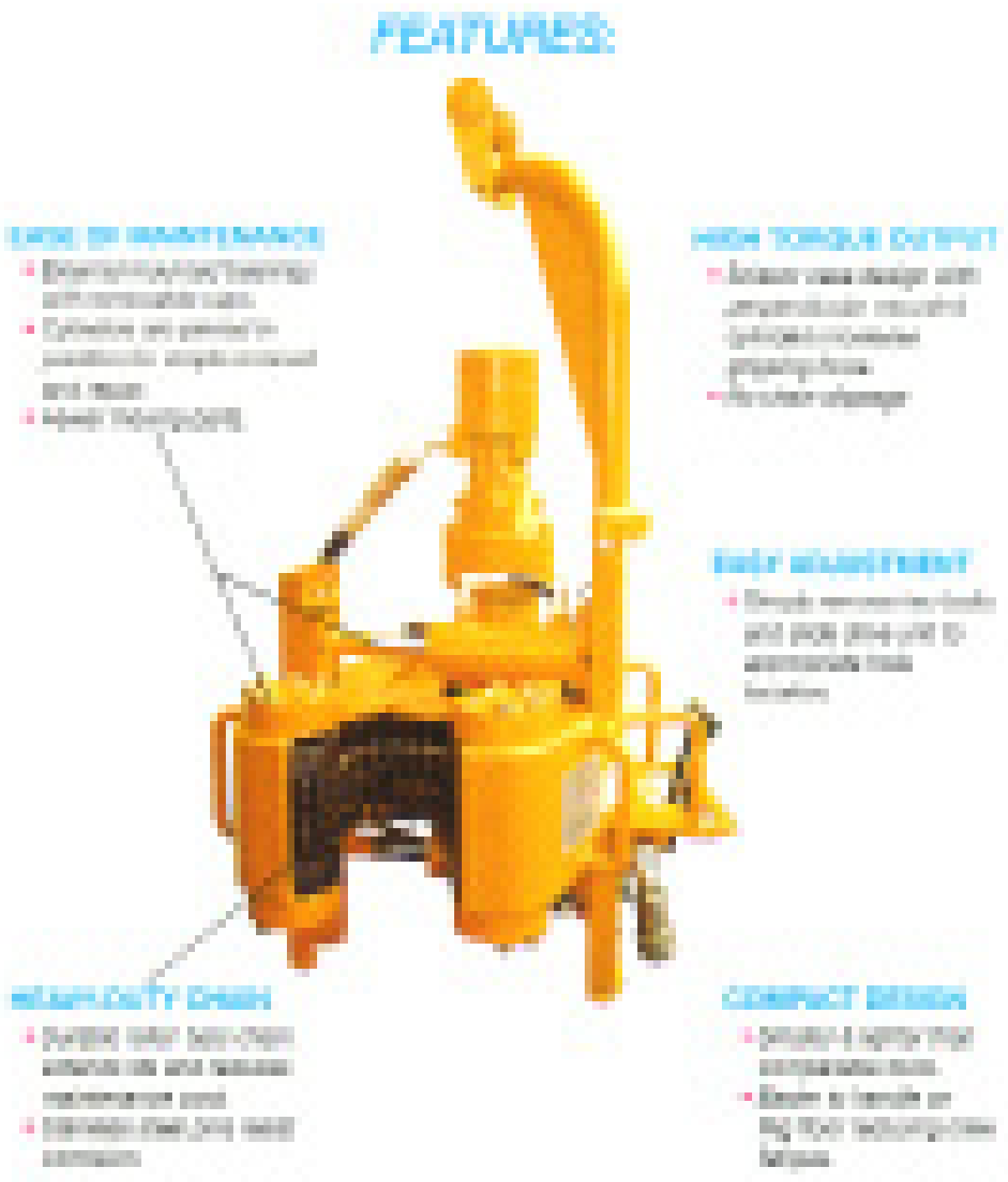
SPINMASTER®

Model 550/950 Series



Introduction

The **Spinmaster** is a new generation drill pipe spinner from that great tradition of its father the Spinnerhawk. The Spinmaster has been engineered to give much more than its predecessor in performance and reliability.

SAFETY

The **Spinmaster** provides a **fast**, **safe** and **efficient** method of spin-up or spin-out, **eliminating costly and dangerous accidents** associated with the use of **spinning chains**.The **Spinmaster's unique chain gripping system** transmits more torque **without slipping** than any competitive spinner, regardless of pipe size.

TIME AND LABOR SAVINGS

Designed to work on the tube rather than the tool joint, the position of the **Spinmaster** provides clearance to place the back-up tong while spinning, thus saving rig time. The **Spinmaster** is the **lightest** and **smallest** drill pipe spinner on the **market** today. This makes the **Spinmaster easier** to **work with** and helps **reduce crew fatigue**. Drillers and operators of the **Spinmaster work** more **efficiently** and **suffer less fatigue** on **long** round **trips**; less work and **faster trips**. Relatively **inexperienced personnel** can be **utilized** for a faster trip with the **Spinmaster** and can work more **efficiently** than would be possible using a **spinning chain**.

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Warranty

STANDARD WARRANTY AND FIELD SERVICE

It is important to Hawk Industries to provide all Spinmaster users with the best tool possible along with the highest degree of dependability and satisfaction. Because of this, we offer the following warranty.

Your Spinmaster must be free of material and workmanship defects for a period of one year from the date of delivery. If any items fail because of a manufacturing defect within that period of time, that item will be replaced by the Hawk Company.

Replacement of parts will be accomplished either at the factory or at a designated service point. This guarantee does not include the replacement of parts where failure occurred due to normal wear and tear or misuse of the tool.

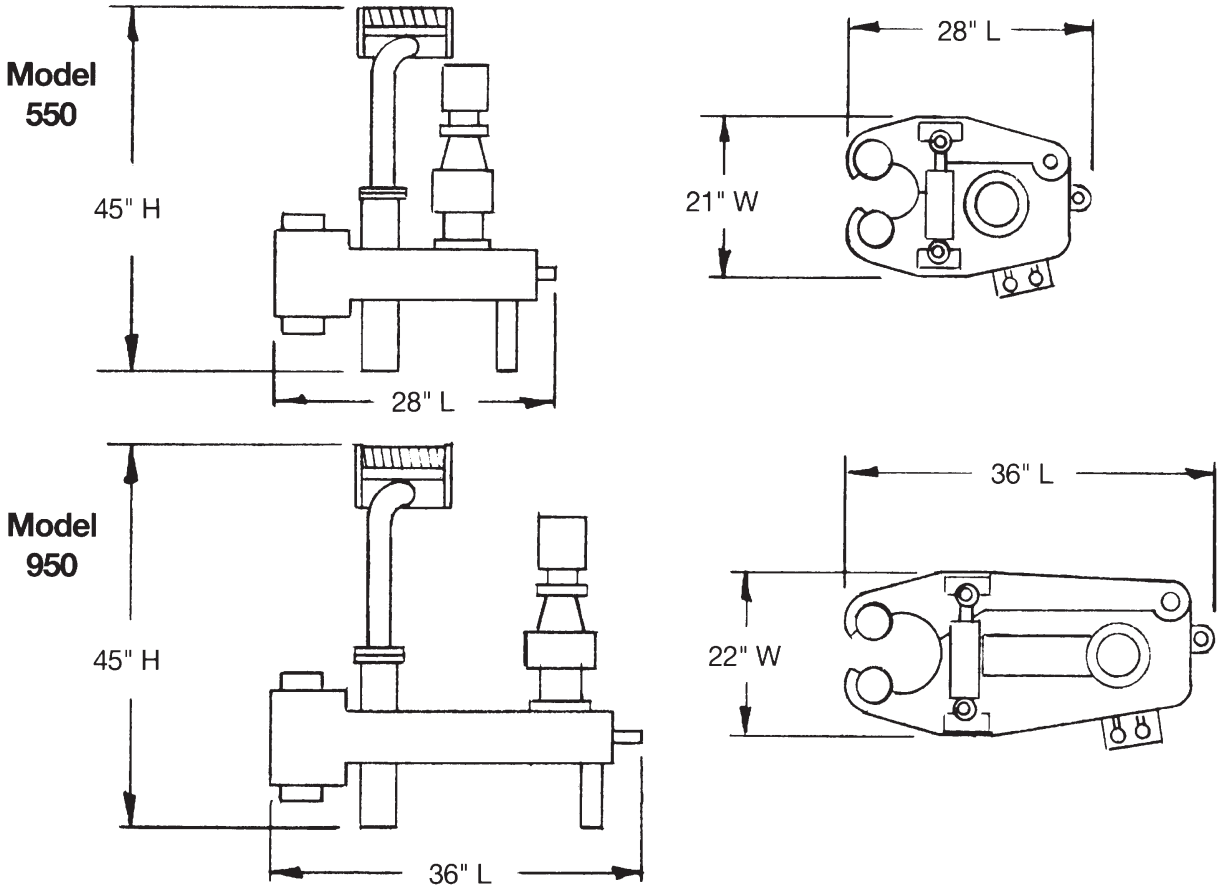
Hawk Industries will in no event be liable for consequential damages or contingent liabilities arising out of the failure of any parts to operate properly.

No expressed, implied or statutory guarantee other than herein set forth is made or authorized to be made by Hawk Industries.

CAUTION

Factory specifications for hydraulics, pneumatics, lubricants, adjustments and safety precautions as set forth in the operation and maintenance manual are for the mutual protection of the owner of the Spinmaster and the company. Failure to adhere to these specifications can reduce the efficiency or life of the equipment and/or cause bodily injury.

Specification Sheet



SPECIFICATIONS

Model	Pipe Size Range (in)	Maximum Torque With No. Chain Slip (ft-lb, NM)	Maximum Speed (rpm)	Weight (lbs, kg)	Dimensions (in mm)			Power Requirements	
					Width	Length	Height		
550-H Hydraulic	2 7/8 to 5 1/2	600 to 1085 **810 to 1464**	130 to 70	500 **226**	21 **533**	28 **711**	45 **1143**	20 gpm at 2000 psi	**151 lpm at 138 bar**
550-A** Pneumatic	2 7/8 to 5 1/2	600 to 1250 **810 to 1687**	130 to 70	550 **249**	21 **533**	28 **711**	45 **1143**	240 cfm at 100 psi	**6.8m³/min at 7 bar**
950-H Hydraulic	2 7/8 to 9 1/2	600 to 1972 **810 to 2662**	130 to 39	575 **260**	22 **558**	36 **914**	45 **1143**	20 gpm at 2000 psi	**151 lpm at 138 bar**
950-A** Pneumatic	2 7/8 to 9 1/2	600 to 2272 **810 to 3067**	130 to 39	625 **283**	22 **558**	36 **914**	45 **1143**	240 cfm at 100 psi	**6.8m³/min at 7 bar**

** THIS UNIT INCLUDES "POWER PACK" (AIR OVER HYDRAULICS) TO OPERATE DOOR CLOSING CYLINDERS.

Ordering Instructions

Example

Quantity	Part #	Serial #	Model #	Part Name
2	031-24731	254	550-H	Bearing
3	031-25CYL25-AS	254	950-H	Grip Cylinder

Installation

Suspension

1. **Connect** the **Spring Hanger (SH)** to at least a **3/8"diameter Steel Cable (SC)** suspended from a **high point** (as near the crown as possible) in the **derrick** no more than **5 ft**. from the center of the **Rotary Table**.
2. **Connect** the lower end of the **spring hanger (SH)** to the **Spinmaster** as shown. Make sure the **shackles (S)** are **tightened securely**. Make sure that the **Spinmaster hangs** in the derrick at a **level** that **assures no contact** with any part of the stabbed **tool joint** (including the upset) when **gripped on tube**.
3. **Hook** a **backup** line to the **rear** of the **Spinmaster** securing the **other end** to the **derrick**. Make sure the **backup line** is **horizontal** and leaves **little slack** when the Spinmaster is **gripped** on the pipe so that **no kick-back** can occur when **changing** spinner **motor directions**.

Part Numbers

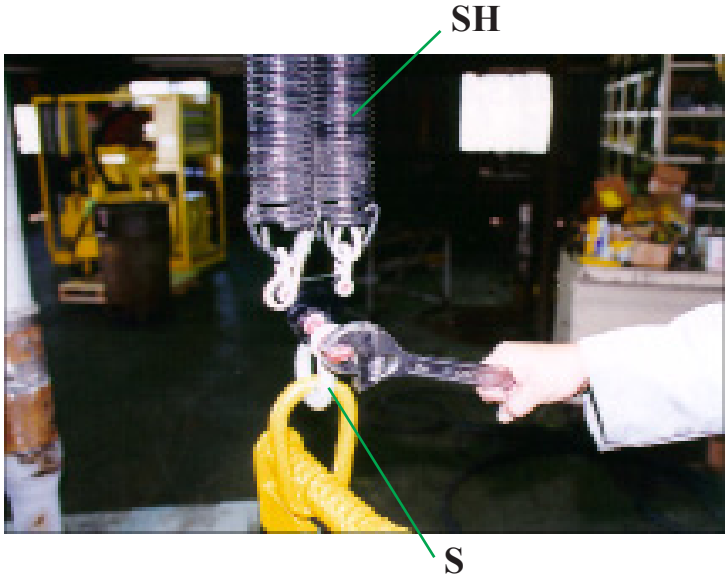
Part Name	Part #
Spring Hanger Assy. (SH)	002-50274

Warning

Failure to properly hook up back-up line could cause bodily injury.

Caution

Hooking up the back-up line on an angle not level with the spinner can cause damage to the spinner case.

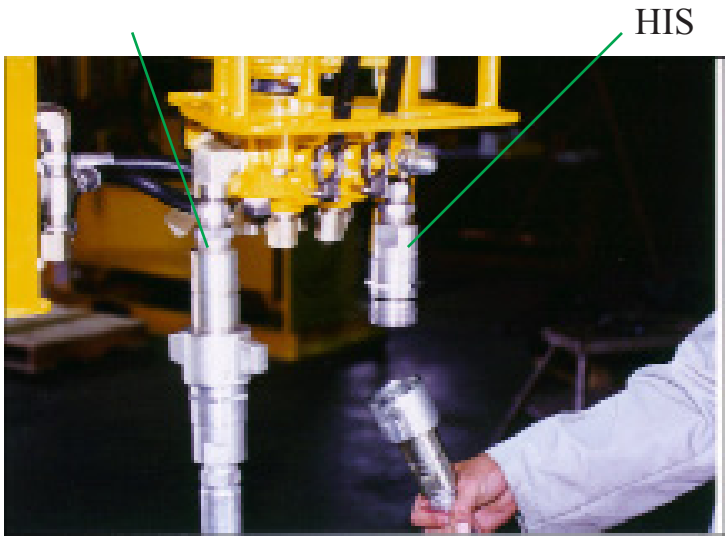


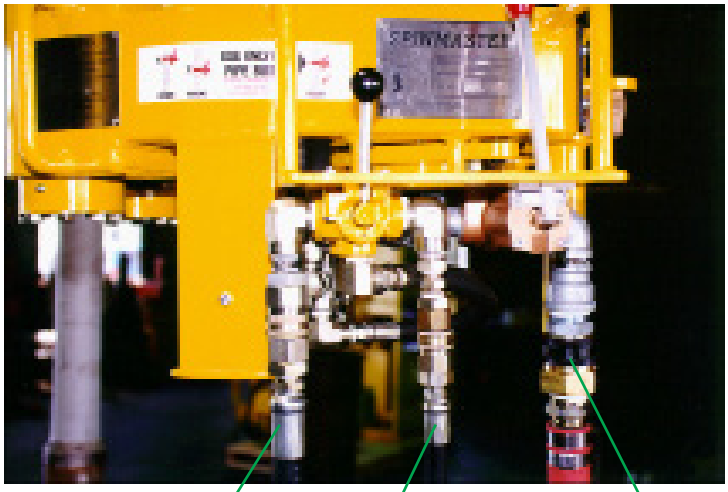
Power Hook-Up

Hydraulic Spinmaster

1. The **hydraulic** Spinmaster requires a **minimum** hydraulic pressure of **2000psi** and a **maximum** pressure of **2500psi**.
2. The hydraulic Spinmaster requires a **minimum** hydraulic **volume** of **20 GPM** and a **maximum** of **volume** of **30GPM**.
3. **Connect** (at least) a **3/4" hydraulic pressure hose** (3000psi working) to the hydraulic **inlet side** (HIS) of the Spinmaster **valve** as shown.
4. **Connect** (at least) a **1" hydraulic return hose** (250psi working) to the hydraulic **outlet** side(HOS) of the Spinmaster **valve** as shown.

> ***Note***
> Hydraulic filtration (at least 25 micron) is highly recommended for Spinmaster for performance and reliablity.





Air Spinmaster

1. **Connect** the three **supply hoses** (supplied with the Spinmaster): the Hydraulic Return Line (HRL), the Hydraulic Pressure Line (HPL), and the Air Supply Line (ASL) **to** the **Spinmaster and** the **Air Power Pack** (APP) as shown.

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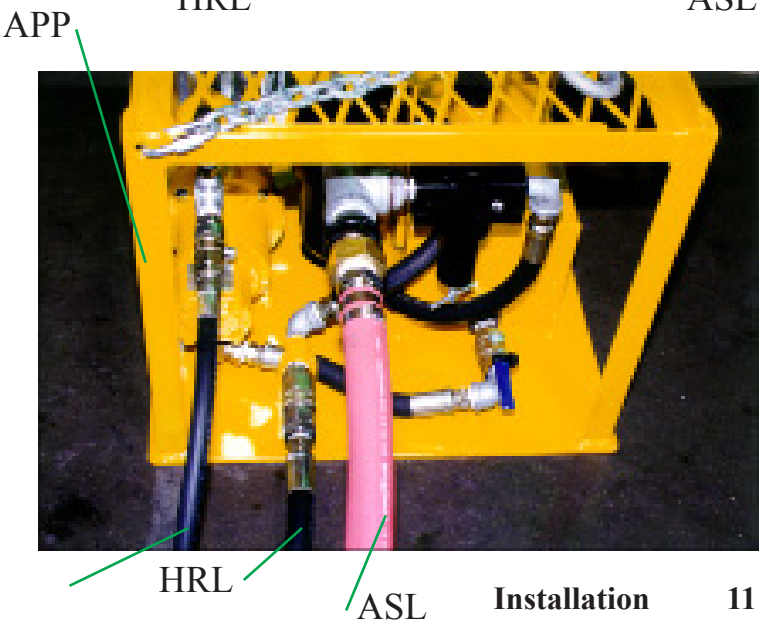
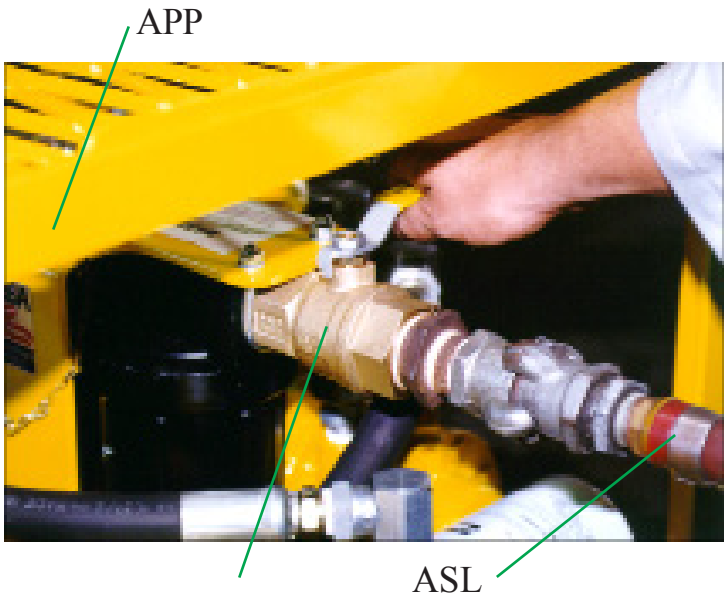


Power Hook-Up, Con't

2. Connect a 1 1/4" air supply line (ASL) from the air source to the Air Power Pack (APP) as shown.
3. To turn on air, rotate Air Supply Valve (ASV) counterclockwise as shown.

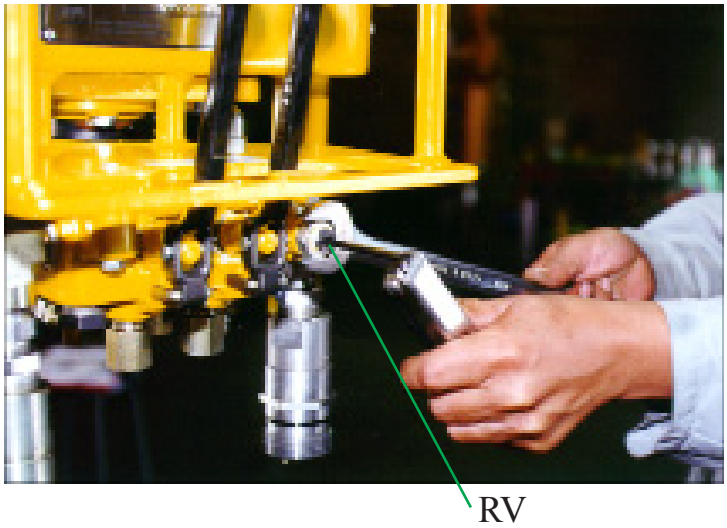
WARNING

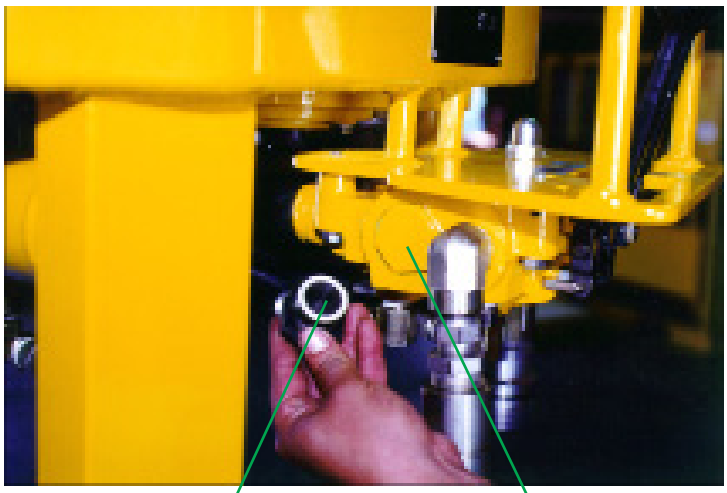
It is recommended that a air regulator from the source air to the power pack be used (1 1/4"Pipe or larger). Excess chain and drive roller wear do to slipping may result if the Spinmaster air power pack receives more than 100 psi air pressure.



Hydraulic Adjustments

1. **Always adjust** the Spinmaster **relief valve** (RV) **above** main **system** hydraulic **pressure** or **over heating** of **oil** may **result**. To **adjust** the **relief** valve, **grip** the **Hydraulic Spinmaster** on the **pipe** (see item #1 on page #17). Use a **4mm Allen wrench** to **screw** the Spinmaster Relief **Valve** (RV) **counter-clockwise** until a hydraulic **flow** sound is **heard**, **then** rotate **clockwise** until **sound (flow) stops**.
2. The hydraulic **Spinmaster** comes **standard** with an **open center** valve configuration. The standard valve can be **re-configured** to **closed center** by **removing** the **Open Center Plug shown** (PS) and **replacing** it with a **Closed Center Plug** (CCP).



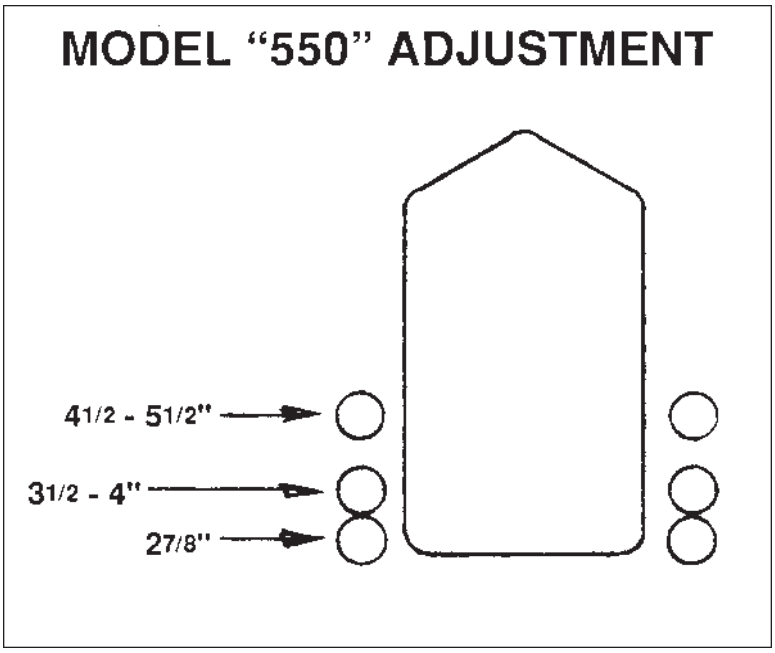


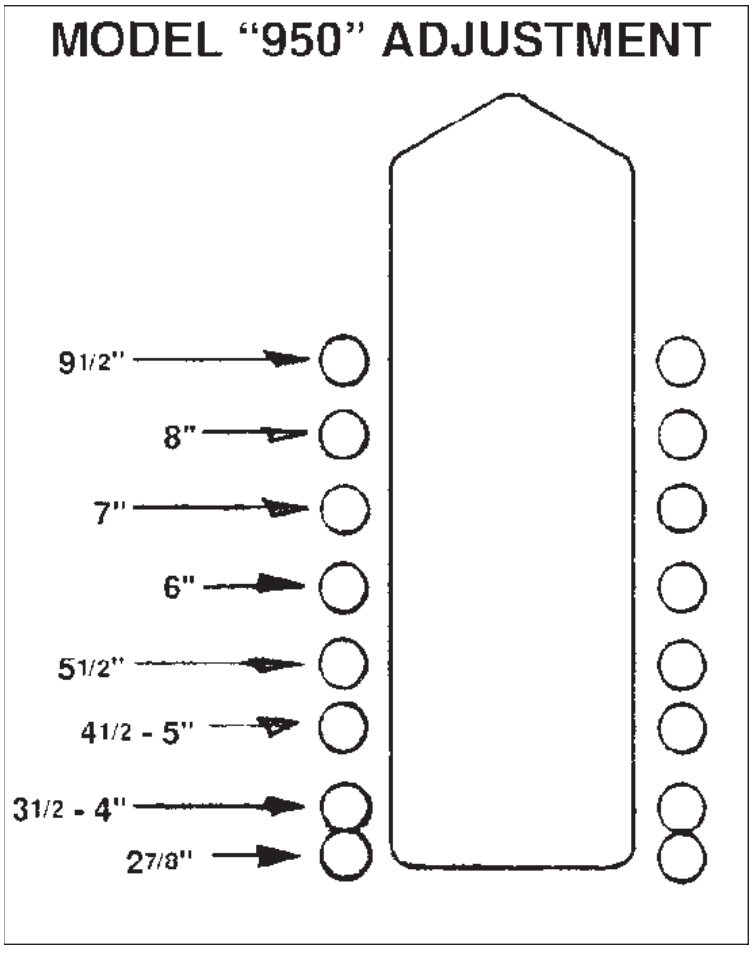
Part Numbers

Part Name	Part #
Closed Center Plug (CCP)	25804
Open Center Plug (PS)	660312003

Notes

Operational Adjustment

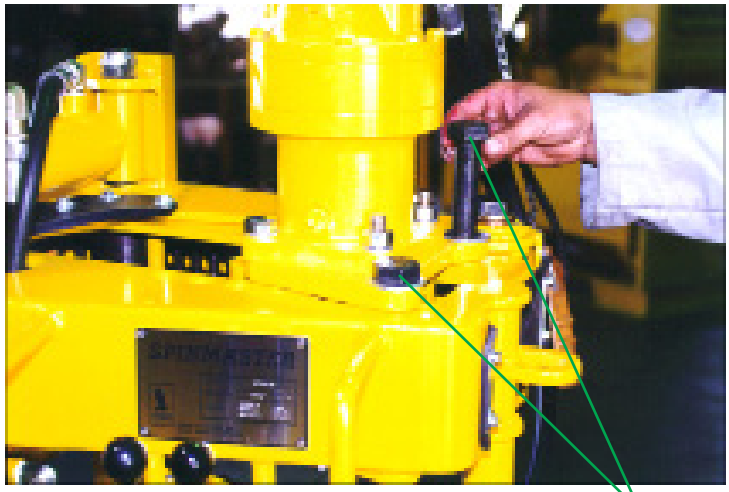




Operational Adjustment

Adjust Pipe Size

1. **Remove** both Adjust **Pins** (AB)
2. **Slide Drive System** (DS) forward or back to **allign** with the desired pipe size adjustment **holes**. See prior page(diagram) or this page (photos) for correct adjustment location.
3. **Replace** Adjust **Pins** (AB). New **Quick Release Pins** look different than shown on photo.

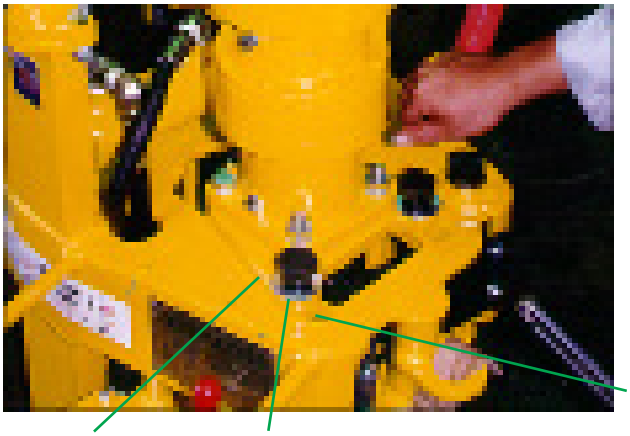


Note

If the drive rollers are touching each other while gripped on pipe, slipping may occur. This is caused by chain stretch (pin wear). To remedy this problem, adjust the Spinmaster to the next smallest setting. If this smaller setting causes the Spinmaster to thrust itself from the pipe while spinning, replace the chain. See Changing the Chain pg.23.

950 Spinmaster

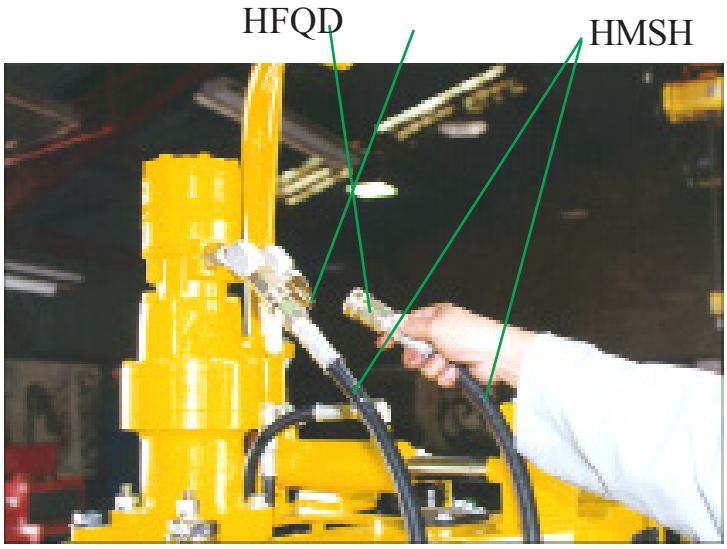
550 Spinmaster



Operational Adjustments

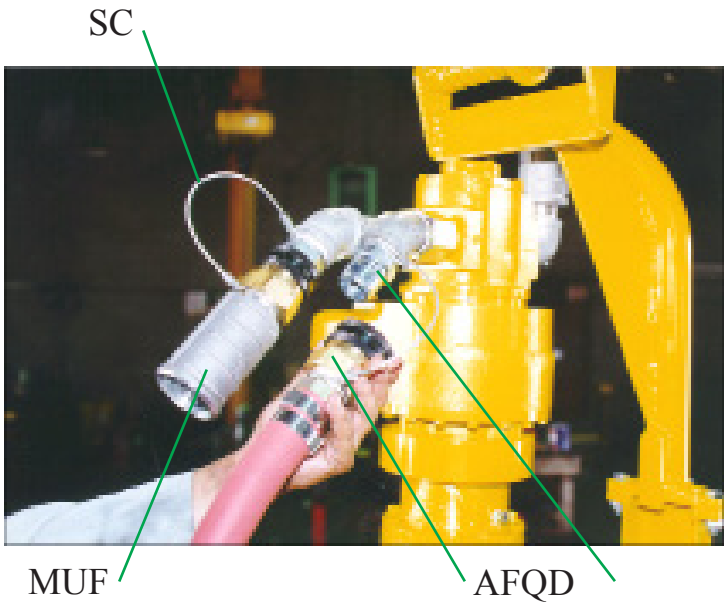
Reverse Hydraulic Spimaster

1. To reverse Hydraulic Spinmaster motor direction, switch motor supply (HMSH) hoses on motor ports as shown.



Reverse Air Spinmaster

1. To **reverse** Air Spinmaster **motor** direction, **switch** motor supply **hose** (AFQD) **and muffler** (MUF) on motor ports as shown. The air quick disconnect will release only when the slott on its slidding sleeve alligns with the partially submerged ball. After engaging quick disconnect, **lock** the **sleeve** by rotating the sleeve out of allignment with the ball.



Part Numbers

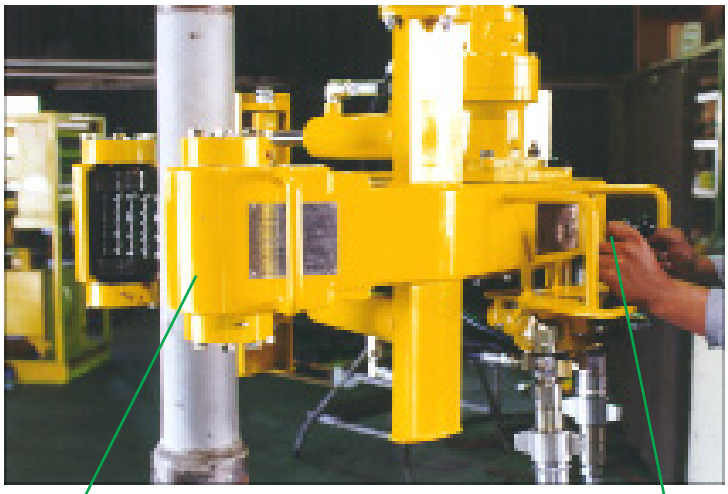
Part Name	Part #
Quick Disc. (HFQD)	031-VHC8-8F
Quick Disc. (HMQD)	031-VHN8-8F
Quick Disc. (AFQD)	031-10S41SL
Quick Disc. (AMQD)	031-10T40
Air Muffler (MUF)	031-MUF-1
Safety Cable (SC)	002-50201-235

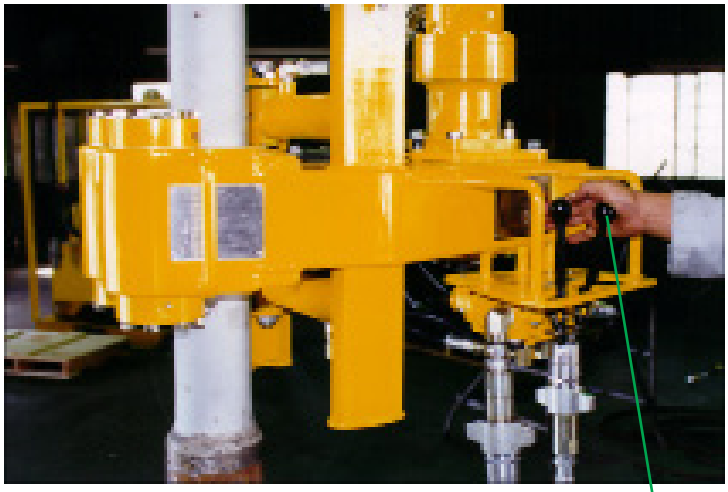
Warning

For safety, always lock air quick disconnects when reversing motor direction.

Operation

1. **Swing Spinmaster** toward pipe until its **chain** is **touching** the **pipe tube**. **While continuing to load Spinmaster (SM) against the pipe**, **push** door **valve** (DV) handle away from you, fully toward the Spinmaster (Detented Position). The **doors** will **close** and the Spinmaster will grip the pipe.
2. To **spinning is complete**, **pull out on** the **Air Motor Valve Lever** (PMV), or **push in** on the **Hydraulic Motor Valve Lever** (HMV) depending on which unit you are operating.
3. **After** the pipe **shoulders**, **release** the motor **valve** and the Spinmaster will **stop**.
4. To **remove** the **Spinmaster** from the pipe, **pull back** on the Door **Valve Lever** (DV) and pull the Spinmaster away from the





Warning

When gripping the Spinmaster on the drill pipe, always keep pushing the Spinmaster toward the pipe while doors are closing or damage may result to the front of the Spinmaster.

AIR SPINNER CONTROLS

HYDRAULIC SPINNER CONTROLS

Warning

Do not operate the **Spinmaster** on drill pipe **protectors** or drill pipe **upset**, or damage may result. See the correct way sticker on the side of the Spinmaster.

Warning

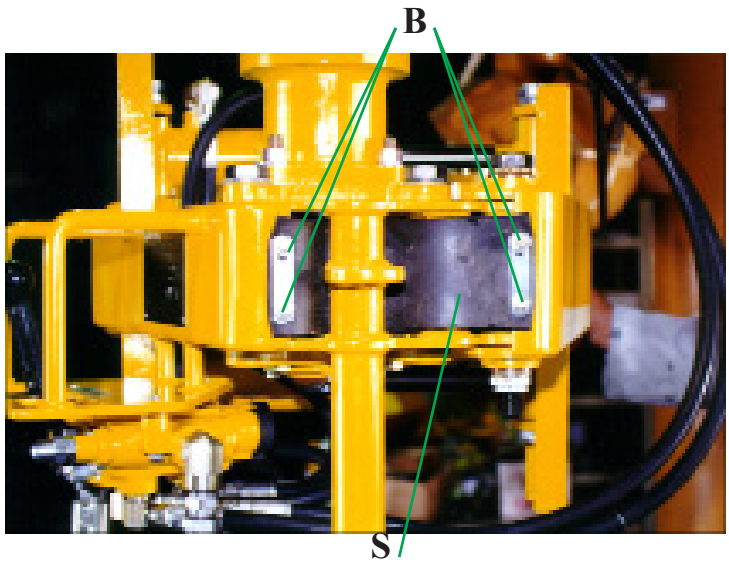
Never operate the **Spinmaster off** the **pipe.**

Lubrication

Grease Once per Week

Lubricant Required

Chevron Pinion Grease Spray
(Part # MS-SP), 7/16" wrench



Chain

1. Use the 7/16" wrench to **remove** the rubber Safety **shield bolts** (B).
2. **Remove** rubber Safety **shield** (S).
3. While spinning out of the hole, from the **back** of the **spinner**, apply **Pinion Grease Spray** (PGS) to all links of the **chain**.
4. **Replace** rubber Safety **shield** (S).
5. Use the 7/16" wrench to replace the rubber Safety shield bolts (B).

WARNING

Run spinner only when gripped on a pipe body.

WARNING

Keep hands away from the main drive sprocket while spraying the chain.

NOTE

Never under any conditions apply weight materials or any other dry materials to the chain.

Lubrication

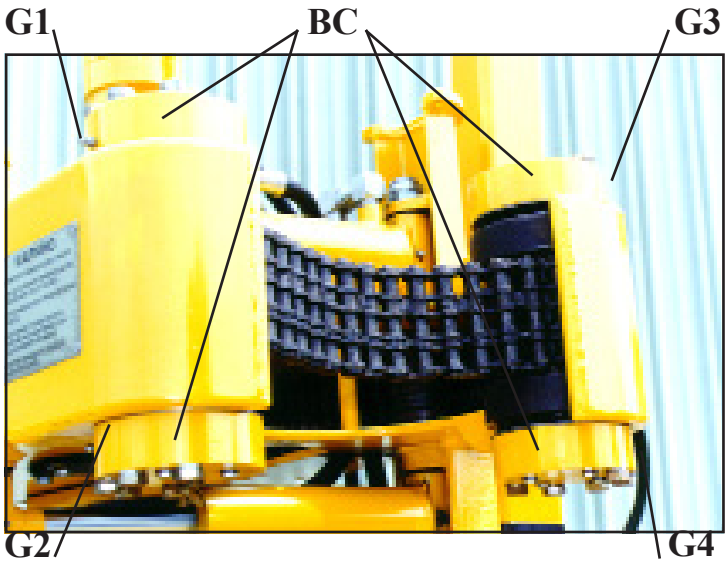
Grease Once per Month

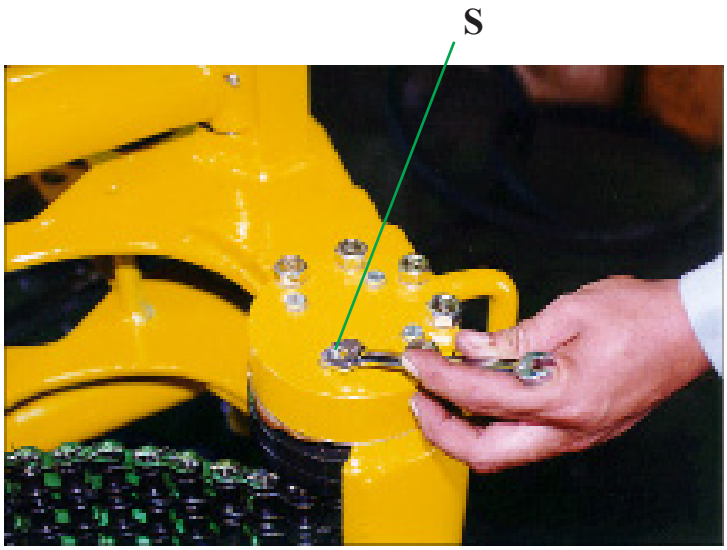
Tools Required

Grease gun, 7/16" wrench

Initial Steps

1. Make sure the Spinmaster is off the drill pipe connection and in the **rest position** on the derrick.
2. **Shut down** the **power** unit.
3. **Bleed** any **hydraulic and/or air pressure** from the Spinmaster, by cycling the door valve lever.
4. **Assume** that there is still a **load** on every actuator. Proceed with caution.





Drive Roller Sprocket Bearings

1. Use the 7/16" wrench to **remove one of** the **four small screws** (S) from the **top** of **each bearing cap** (BC).
2. **Pump** the four **grease fittings** G1-G4 until grease comes out of the small screw hole.
3. Use the 7/16" wrench to **replace** the **small screw** (S).

Part Numbers

Part Name	Part #
Bearing Cap Screw (S)	999-805834
Straight Grease Fitting	031-1103K1

Lubrication

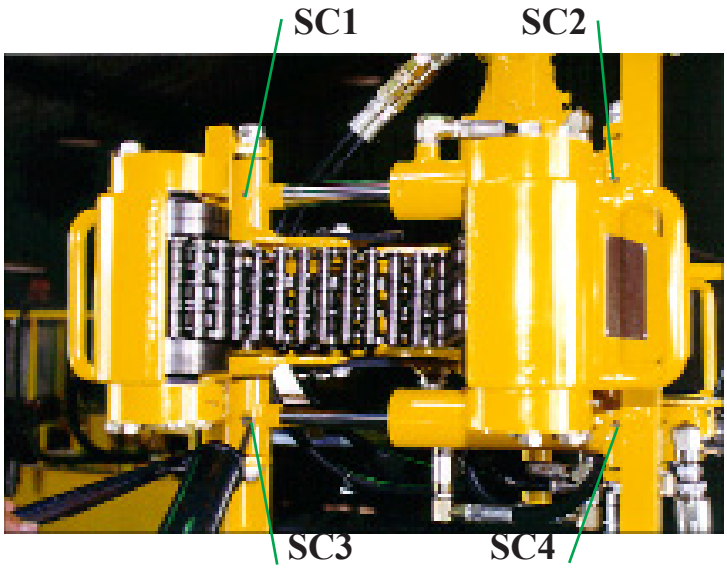
Grease Once per Month

Tools Required

Grease gun

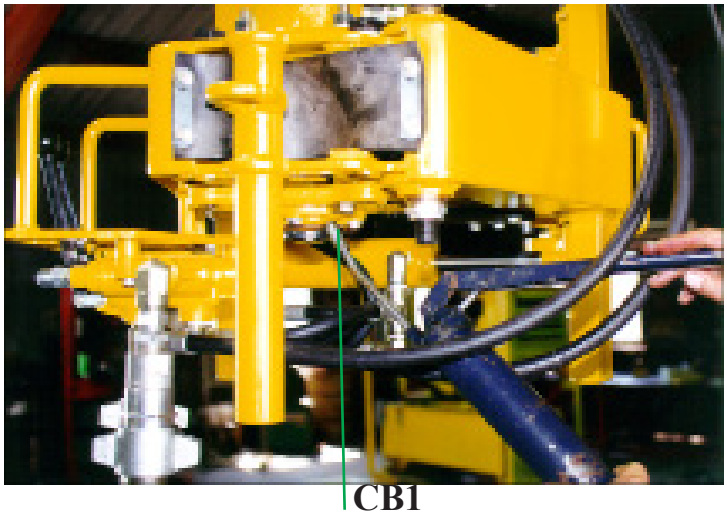
Spinner Grip Cylinders

1. **Pump** the **four grease fittings** SC1-SC4.



Drive Shaft Bearing

1. **Pump grease fitting** CB1



Lubrication

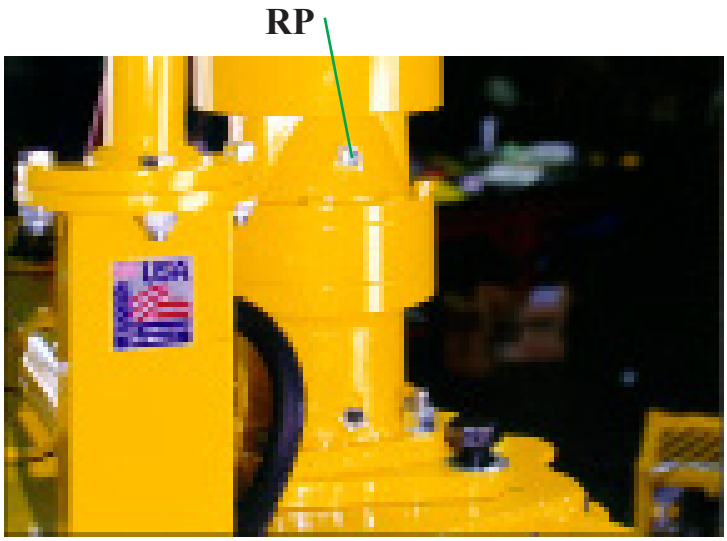
Check Oil Level Once per Month

Reducer Gear Box

Lubricant Required

85-90 weight gear oil
SAE #AGMA5

1. Make sure the gear box **oil level** reaches the **top pipe plug** (RP).
2. Check for any oil leakage from the gear box seal by looking at the top or the drive shaft.



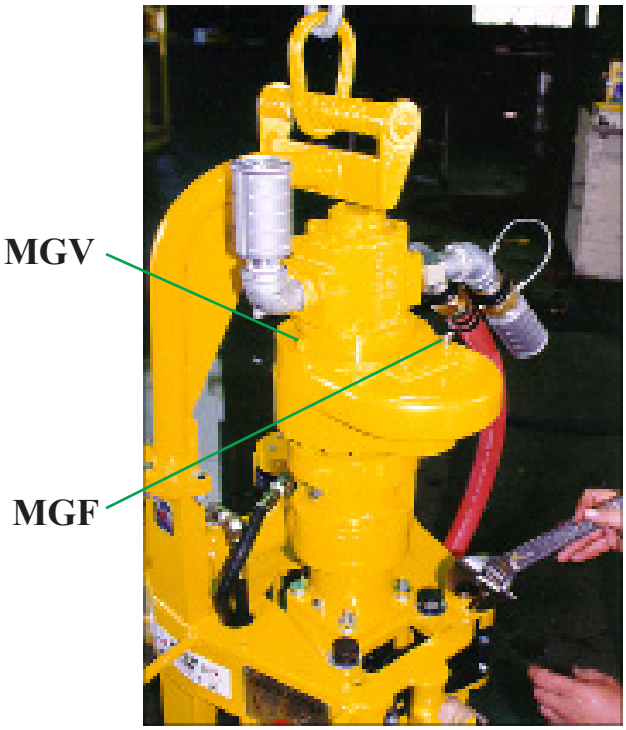
Grease after overhaul

Air Motor Gear Box

Lubricant Required

Lithium Base #2 High Temperature Grease. Use Lo-Temp Grease in temperatures -20 deg. F or below.

1 Remove motor grease vent plug (MGV). Use a grease gun to fill the air motor gear box at the motor grease fitting (MGF) until grease begins to flow from the vent (MGV).
2. Replace the vent plug (MGV)



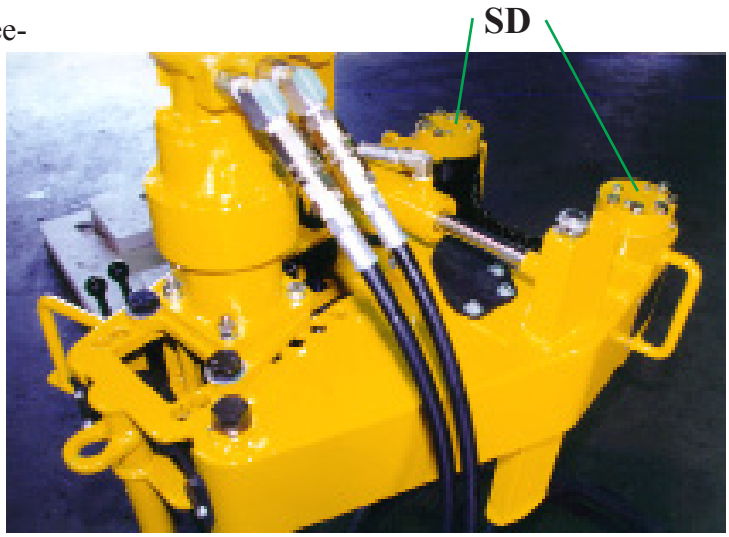
NOTE

Consistent lubrication of the Spinner increases performance and component life.

Changing the Spinner Chain

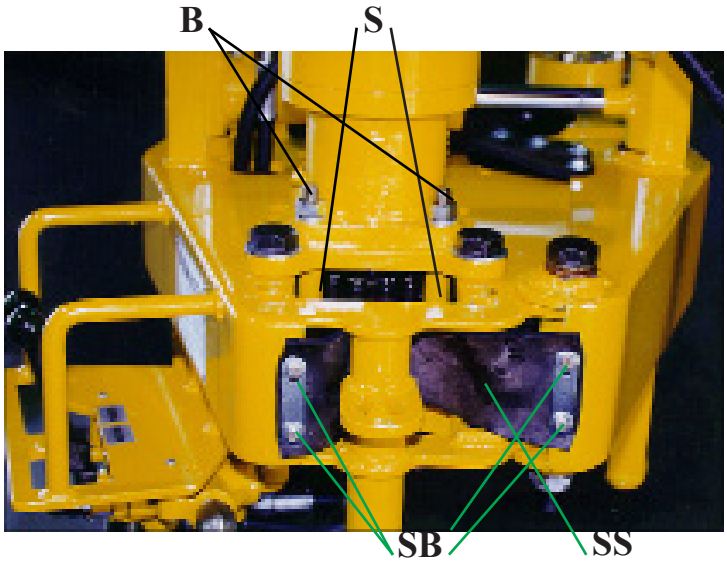
Tools Required

7/8" wrench, 7/16" wrench, Hammer, Needle-Nose Pliers



Initial Steps

1. Make sure the Spinmaster is off the drill pipe connection and in the **rest position** on the derrick.
2. **Shut down** the **Air Power Pack** or the **hydraulic power unit**.
3. **Bleed** any **hydraulic and/or air pressure** from the Spinmaster , by cycling the door valve lever; Make sure the doors are fully open.
4. **Assume** that there is still a **load** on every actuator. Proceed with caution.



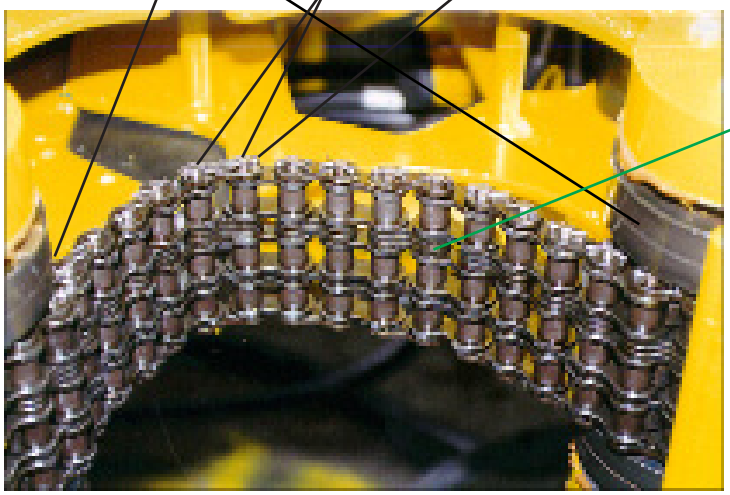
Chain

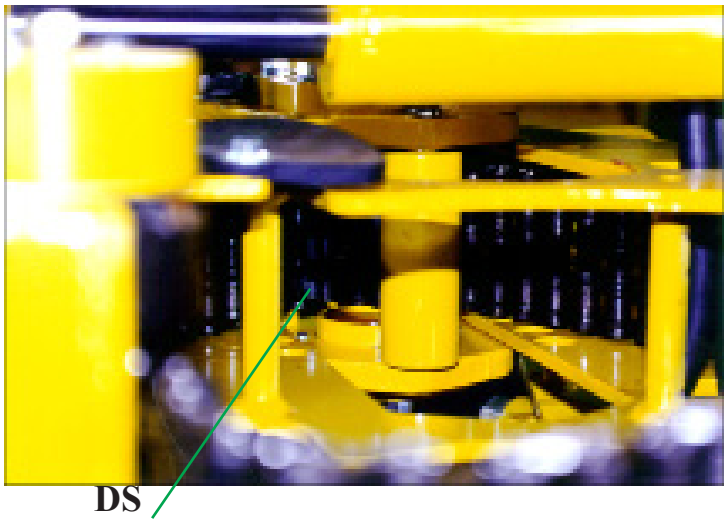
1. Make sure the **Spinner doors** (SD) are fully **open**.
2. Use the 7/8" wrench to **loosen** the **Spacer Bolts** (B).
3. Use the 7/16" wrench to **remove** the **four** rubber Safety shield **bolts** (SB).
4. **Remove** the rubber Safety **shield** (SS).
5. **Remove** the **Spacer Bolts** (B) and **Spacers** (S).

Continued on next page.

Changing the Spinner Chain (cont.)

6. From the front of the unit, use the Needle-nose pliers to **remove** the **Cotter pins** (CP) in one of the Chain links.
7. Use the hammer to **remove** the **Chain link pins** (CLP).
8. **Pull out** the **old chain**. Make sure the chain does not catch on the Drive Sprocket (DS).
9. **Feed** the new **chain** into the spinner **behind** the **Drive Sprocket** (DS), tripple link up until both ends of the new chain meet at the Drive roller sprockets (DRS).
10. **Feed** the **ends** of the **chain** around the **outside** of the **Drive roller sprockets** (DRS).
11. **Place** the **ends** of the new chain **together**.
12. **Insert** the **Master Link**.
13. **Place** the **End Cap** on the **Master Link**.
14. Use the Needle-nose pliers to **insert** the Master Link **Cotter Pins**.





Part Numbers

Part Name	Part #
Chain (950 Series)	031-25CHAIN
Chain (550 Series)	031-24CHAIN
Chain Repair Kit	031-25CHAIN-RK

WARNING

Running a new chain with worn Drive Rollers severely shortens chain life. If the **Drive Roller Groove** is **no longer visible**, **replace** the **Drive Roller**.

Changing the Drive Rollers

Tools Required

3/4" wrench

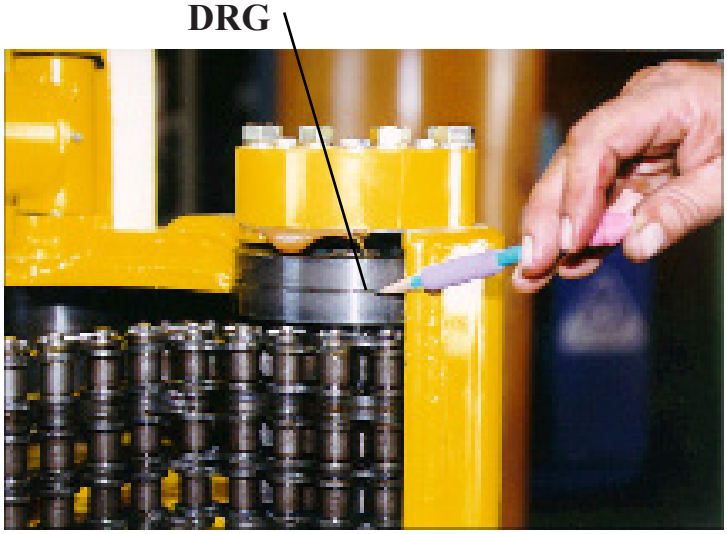
Initial Steps

1. Make sure the Spinmaster is off the drill pipe connection and in the **rest position** on the derrick.
2. **Shut down** the **power** unit.
3. **Bleed** any **hydraulic and/or air pressure** from the Spinmaster, by cycling the door valve lever. Make sure the doors are fully open.
4. **Assume** that there is still a **load** on every actuator. Proceed with caution.

Changing Drive Roller

1. When the **Drive Roller Groove** (DRG) is **worn** down so that it is **no longer visible**, the **Drive Rollers** need to be **replaced**.

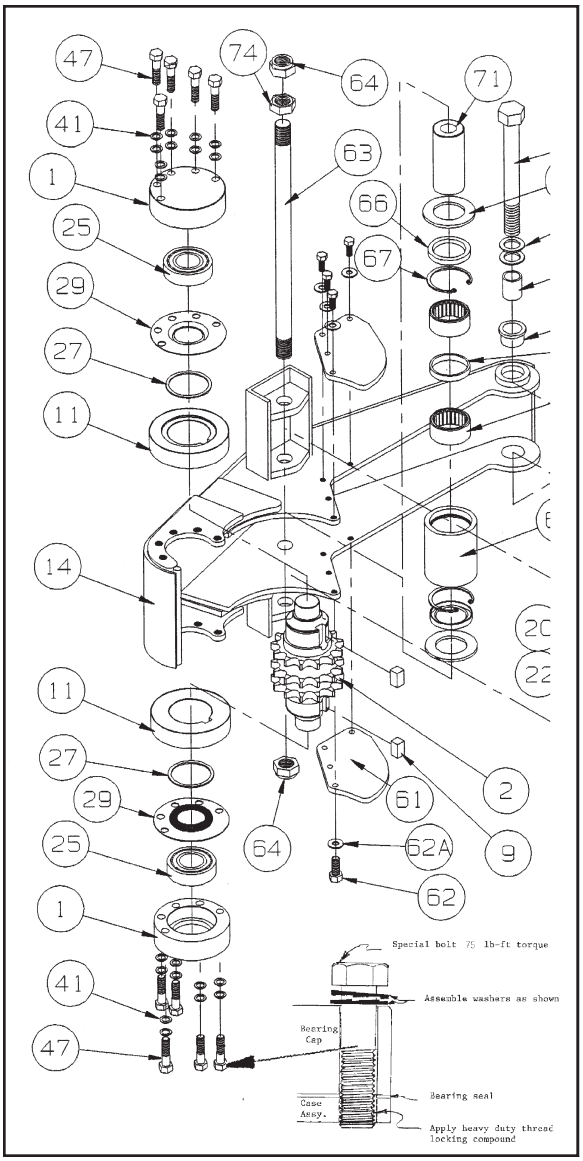
Continued on next page.



Changing the Drive Rollers (cont.)

2. Use the 3/4" wrench to **remove** all Bearing Cap **Bolts** (47).
3. **Remove** the Bearing **Caps** (1) **and** Bearing **Seals** (29).
4. **Slide out** the **Drive Roller Sprockets** (2).
5. **Remove** the Drive Roller **Snap Rings** (27).
6. **Remove** the **Drive Rollers** (11) **and Keys** (9).
7. **Slide on** the **new Drive Rollers** and **replace** the **Keys** (9).
8. **Replace** the Drive Roller **Snap Rings** (27).
9. **Slide in** the **Drive Roller Sprockets** (2) . **Make sure** the **"T"(stamped)** on each Drive Roller Sprocket **faces up**.
10. **Replace** the Bearing **Caps** (1) and Bearing Seals (29).
11. Use the 3/4" wrench to **replace** all Bearing Cap **Bolts** (47). Use new Lock Washers (41) and red loctite when replacing the Bearing Cap Bolts (47).

    Assemble the **Lock Washers** (41) **as shown**. **Torque** Bearing Cap **Bolts** (47) to 75 lb. ft.



WARNING

Replace all four Drive Rollers. **Running** the **Spinner with worn Drive Rollers will damage** the **chain** and **hinder** Spinner **performance**.

Part Numbers

Part Name	Part #
Bearing Cap Bolt (47)	999-806373
Lock Washers (41)	031-91074A033
Drive Roller (11)	031-24649
Bearing Seal (29)	031-24654

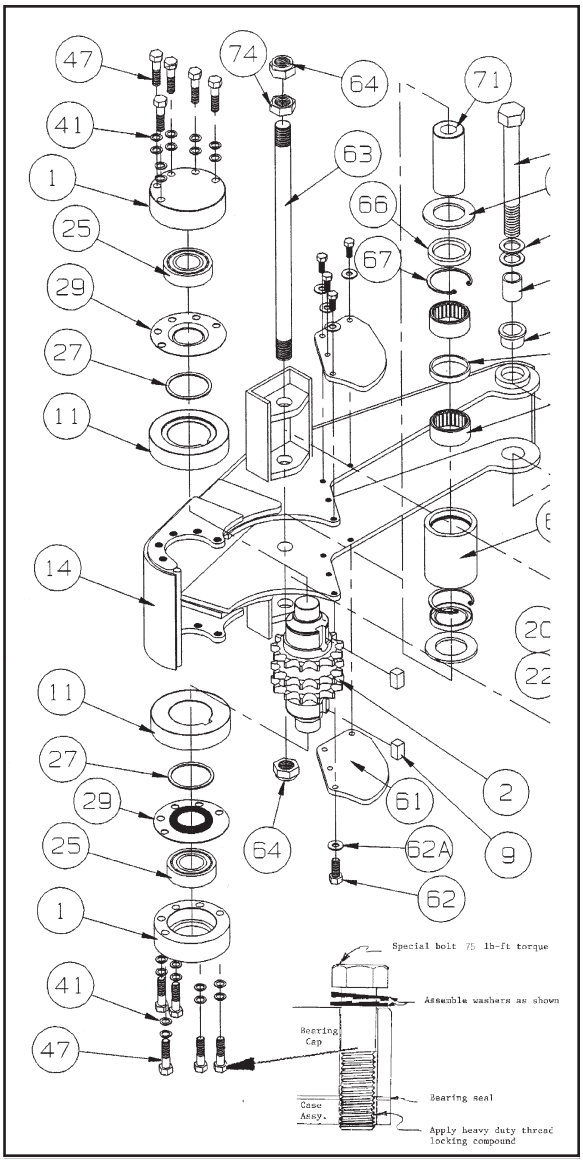
NOTE

Replace the Drive Sprocket and Drive Roller Sprockets if the Chain Continues to wear out prematurely.

Changing the Drive Roller Sprocket Bearings

Tools Required

Four 1/4"-20 x 1 1/2" Hex Tap SS (Part # 999-805867), 7/16" wrench, 3/4" wrench

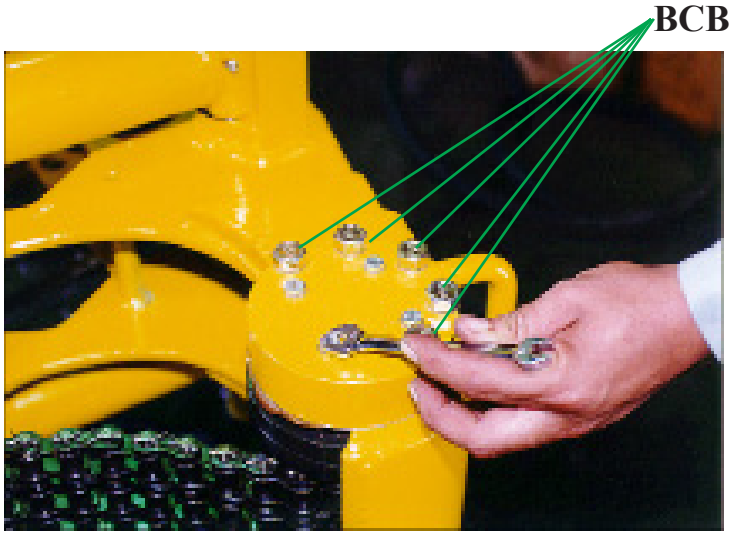


Initial Steps

1. Make sure the Spinmaster is off the drill pipe connection and in the **rest position** on the derrick.
2. **Shut down** the **power** unit.
3. **Bleed** any **hydraulic and/or air pressure** from the Spinmaster , by cycling the door valve lever; make sure the doors are fully open.
4. **Assume** that there is still a **load** on every actuator. Proceed with caution.

Drive Roller Sprocket Bearings

1. Use the 3/4" wrench to **remove** all **Bearing Cap Bolts** (BCB).
2. **Remove** the Bearing **Caps** (1) and Bearing Seals (29).
3. Use the 7/16" wrench to remove the four small screws in the top of the Bearing Caps (1).



Continued on next page.

4. Use the 7/16" wrench to **screw** in the **Hex Tap Screws (HTS) into** the four small **threaded holes in** the **top of** the **Bearing Caps** (1). As the screws tighten, the bearing (25) is pushed out. **Tighten** the **Hex Tap screws evenly**, or the bearing (25) will tilt and lodge in the bearing cap (1).
5. **Insert** the **new bearings** into the Bearing Caps (1).
6. **Replace** the Bearing **Caps** (1) and Bearing Seals (29).
7. Use the 3/4" wrench to **replace** all Bearing Cap **Bolts** (47). Use new Lock Washers (41) and Red Loctite when replacing the Bearing Cap Bolts (47). **Assemble** the **Lock Washers** (41) **as shown**. **Torque** Bearing Cap **Bolts** (47) to 75 lb. ft.

HTS

NOTE

Hawk recommends that all four bearings (25) be replaced each time a bearing (25) is changed. Always use new lock washers (41) when replacing bearing cap bolts (47).

NOTE

Hawk recommends that all four bearing seals (29) be replaced each time a bearing (25) is changed.

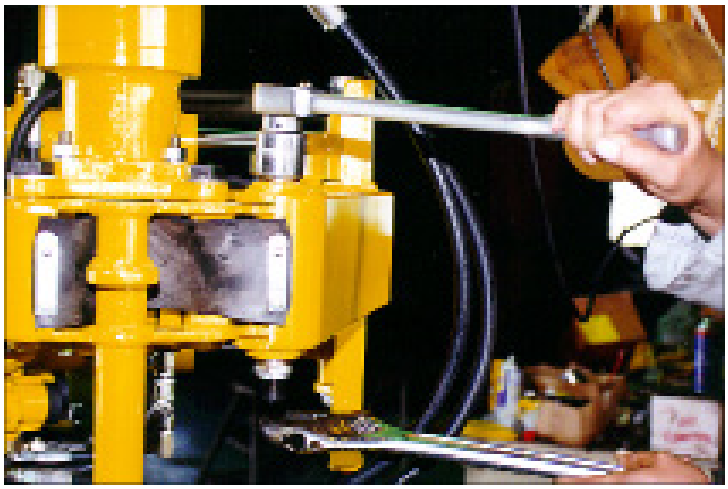
Part Numbers

Part Name	Part #
Hex Tap Screw	999-805867
Bearing Cap Bolt (47)	999-806373
Lock Washers (41)	031-91074A033
Bearing Seal (29)	031-24654
Bearing (25)	031-24731

Changing Rear Pivot Assembly

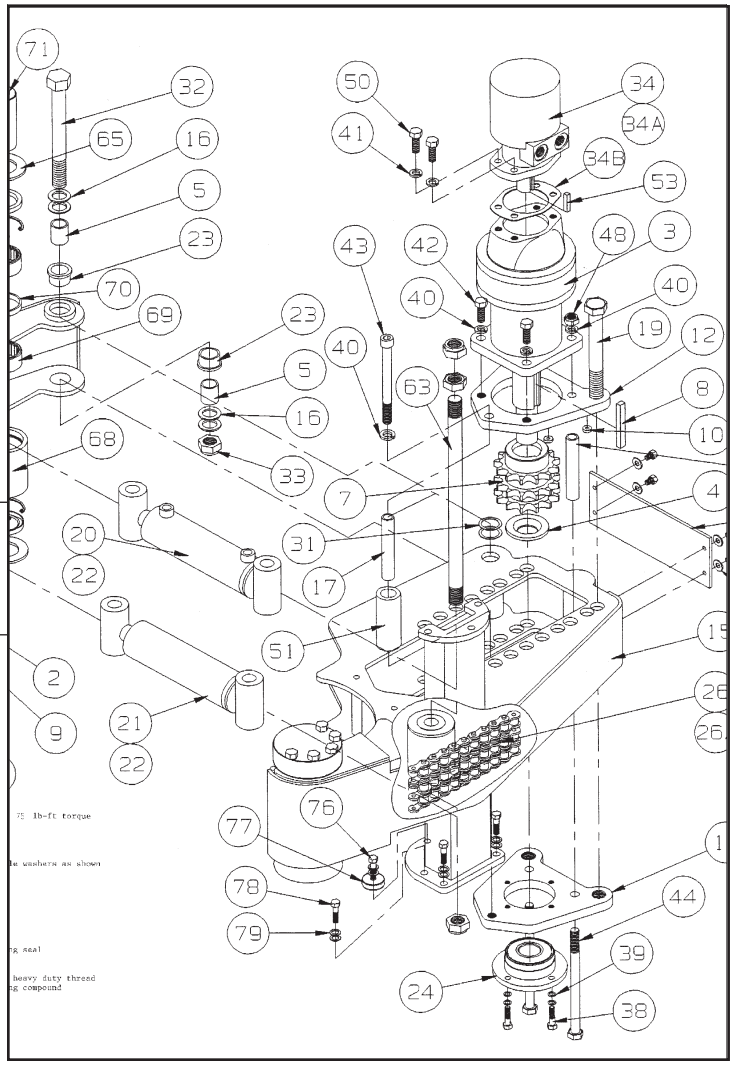
Tools Required

Two 1 1/2" wrenchs, Hammer, Punch.



Changing Rear Pivot Assembly

1. Set Spinmaster on a flat surface
2. Use the two 1 1/2" wrenchs to **remove Pivot Bolt** (32)
3. **Remove** two **pivot sleeves** (5) from the moving case halve.
4. **Pivot** the **moving case** halve **away** from the stationary case halve.
3. **Remove** two pressed in brass **flange bearings** (23) from the moving case halve.
4. Replace all parts (5,16,23, 32), and reassemble in reverse



Part Numbers

Part Name	Part #
Bushing (5)	031-24637
Lock Washer Set (16)	031-91074A038
Flange Bearing (23)	031-24729
Hex Bolt (32)	031-91268A935

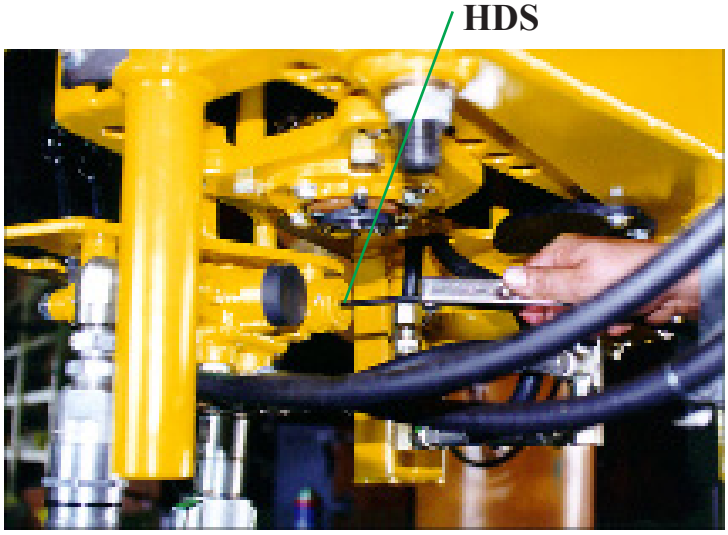
Changing All Other Spinmaster Parts

1. See Drawings, p.48-54.

Adjust Door Valve Detents

Hydraulic Spinmaster

1. Remove the rubber cover and use a 1/4" Allen Wrench and **rotate** the **hydralic detent screw** (HDS) at the rear of the hydraulic valve **clockwise** to **increase detent** pressure and **counter-clockwise** to **reduce detent** pressure. Adjust to a pressure that assures good holding strength when shifted to grip on pipe. **Replace** the rubber **cover**.

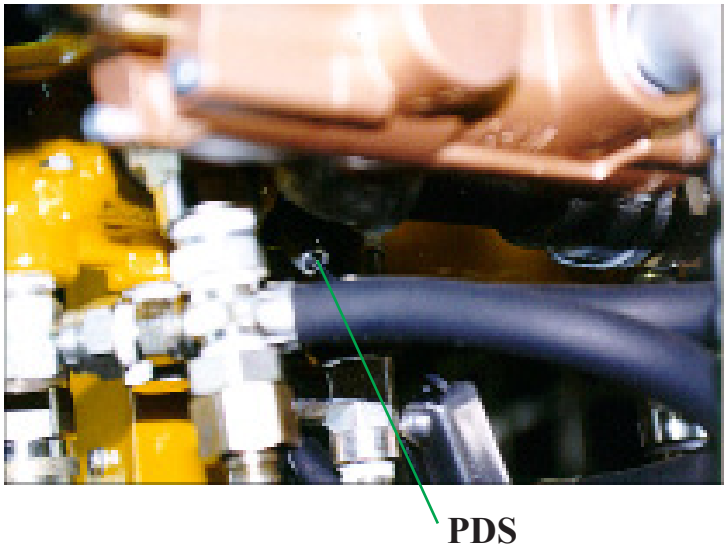


WARNING

If the hydraulic valve detent is not maintained on the Hydraulic and Air Spinmaster , the unit will slip while spinning pipe .

Air Spinmaster

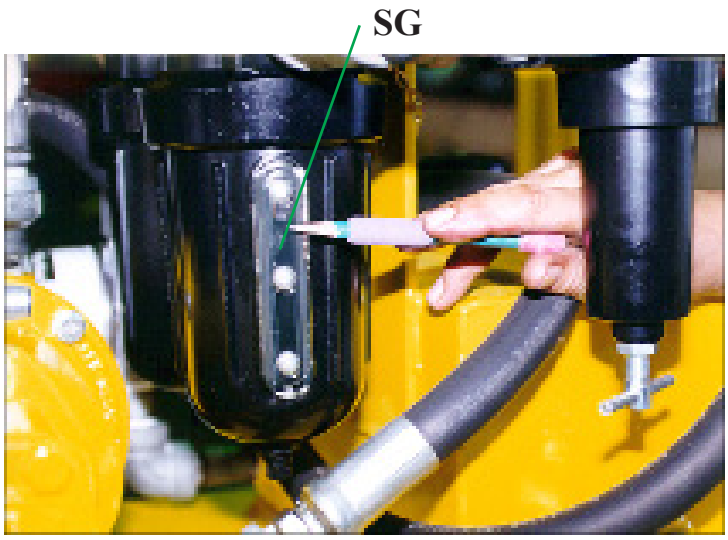
1. Use a 3/16" Allen Wrench and **rotate** the **detent screw** (PDS) at the rear of the door valve **clockwise** to **increase detent** pressure and **counter-clockwise** to **reduce detent** pressure. Adjust to a pressure that assures good holding strength when the door valve lever is shifted to close the spinner doors.

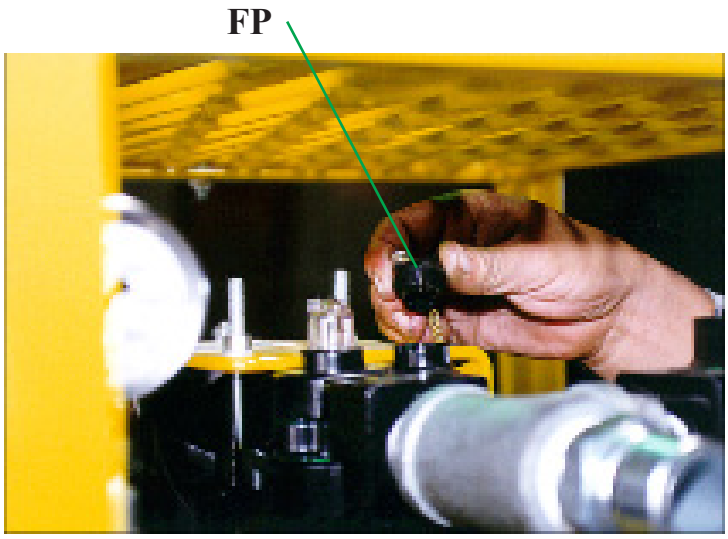


Air Power Pack Maintenance

Filling Air Lubricator

1. **Check** oil **level** at least **once per day** using oil level sight gage (SG) .
2. **To add oil** to the air lubricator, **remove filler plug** (FP).
3. Use a small funnel and fill lubricator with **#10 wt. pneumatic oil** up to the filler cap.
4. Replace filler cap





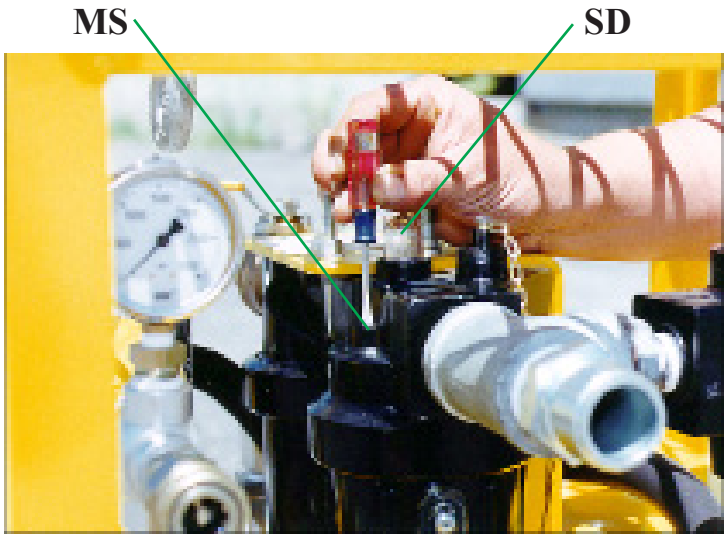
WARNING

The Air Spinmaster air motors (Main Motor & Power Pack Motor) must be lubricated to provide dependable service. **Air motors will rust up on the inside and lock up if not lubricated**.

Air Power Pack Maintenance

Air Lubricator Adjustment

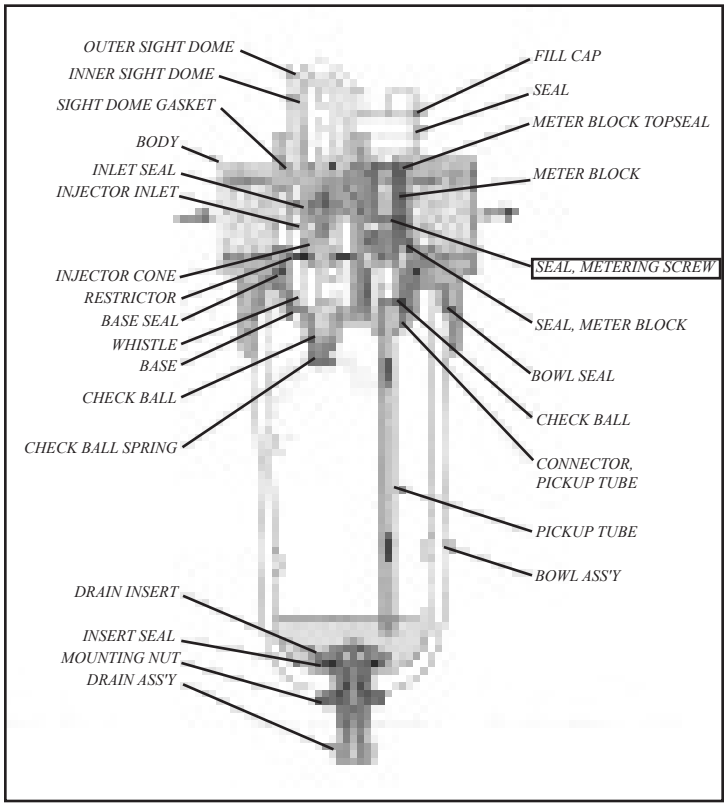
1. The **proper adjustment** to the air lubricator **saves oil** and **maximizes** air motor **performance**.
2. Using a small flat screw driver, **rotate** the lubricator metering **screw** (MS) **counter-clockwise** to **increase** oil flow and **clockwise** to **decrease** oil flow.
3. The proper adjustment is **one (1) drop per minute to minute and one half** when Spinmaster's **main motor** is **idle**, or two **(2-3) drops per connection** when Spinmaster **main motor** is **in use**. To adjust the lubricator, the power pack must be turned on.
4. Lubricator **drops can be seen** at the lubricator **sight dome** (SD) located on top of the lubricator as shown.



Air Lubricator Maintenance

ITEM	P/N
DRAIN	002-F17-2

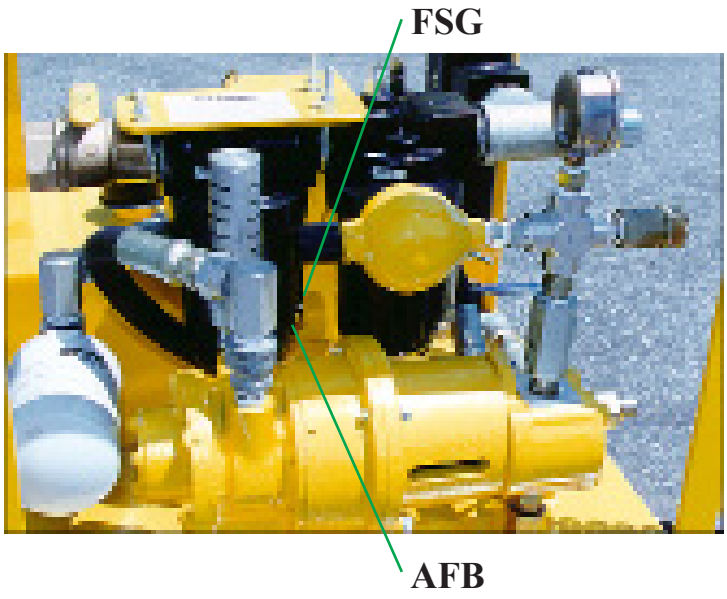
031-L17 Air Lubricator



Air Power Pack Maintenance

Changing Air Filter Element

1. The **air filter element** should be **changed** once **every three (3) months**.
2. **Unscrew** the air filter **bowl** (AFB) and **replace** the **element.**
3. The filter is an auto-drain type. **Make sure** the **auto-drain** system is **working correctly** by **checking** the **fluid level sight gage** (FSG) on the side of the bowl. If the fluid **level** is **higher** than the **middle** of the **sight gage**, **the auto-drain is mal-functioning. Replace** the **auto-drain** as shown in the filter diagram below.



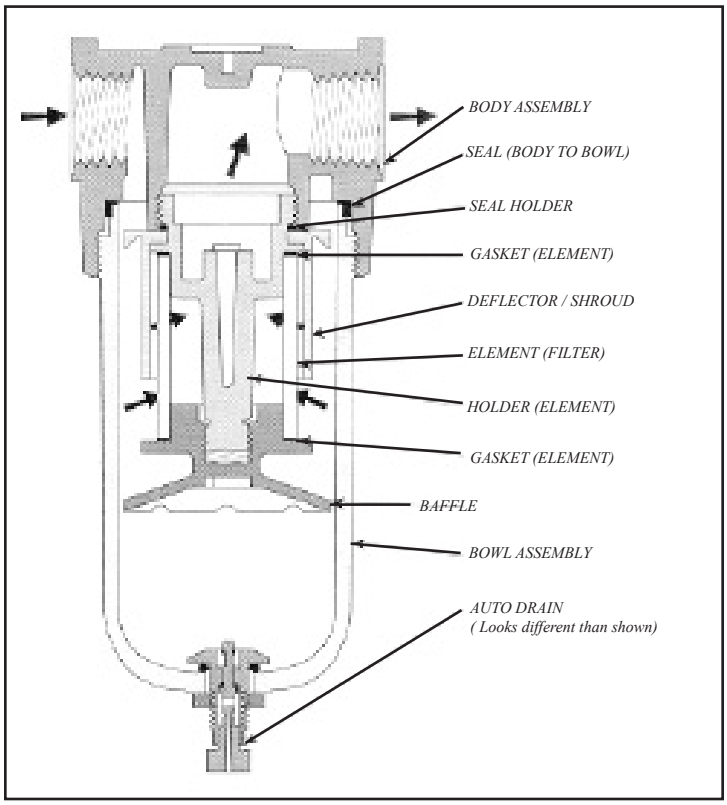
Air Filter Maintenance

ITEM	P/N
ELEMENT	002-F17-1
DRAIN	002-F17-2

NOTE

Clean and **dry air** is **essential** for maximum Spinmaster performance and **dependability**.

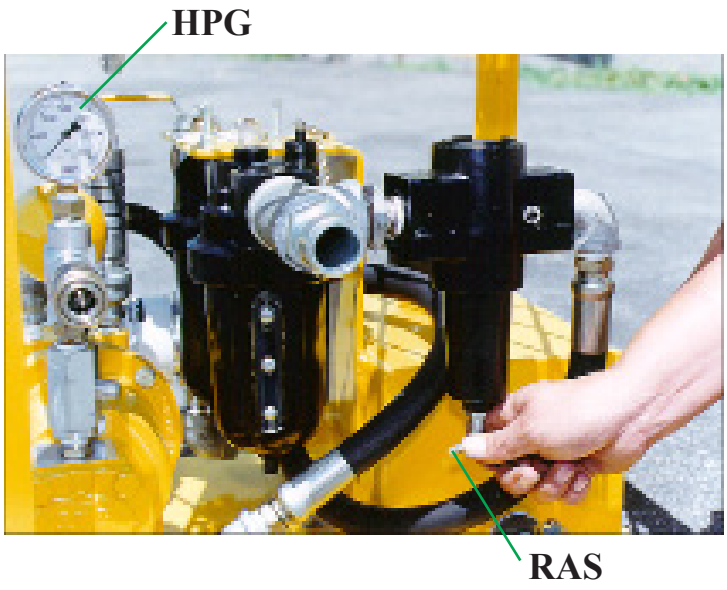
031-F17 Air Filter



Air Power Pack Maintenance

Adjusting Grip Pressure

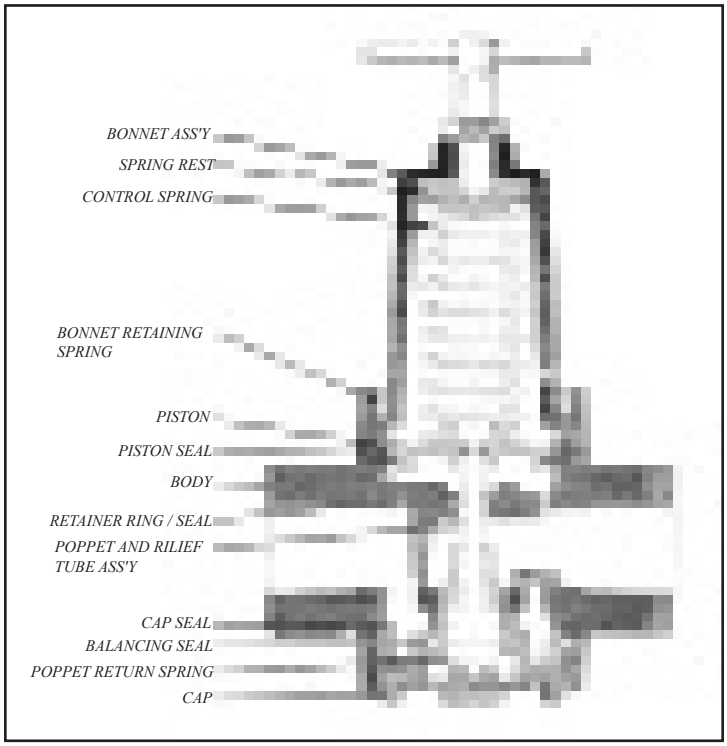
1. The **power pack** hydraulic grip pressure is **set** from the **factory**.
2. However if it becomes necessary to re-adjust the hydraulic grip pressure output of the power pack, **rotate** the regulator **adjust screw** (RAS) **in** to **increase** hydraulic **grip pressure** output and screw **out** to **decrease pressure**.
3. **Adjust** hydraulic **pressure** to **1800-2000psi**. **Watch** hydraulic pressure **gage** (HPG).
4. **Lock** the **jam nut** on the regulator adjust screw (RAS) to lock in setting.



Air Regulator Maintenance

ITEM	P/N
POPPET KIT	031-P15-1
RELIEVING PISTON KIT	031-P15-2

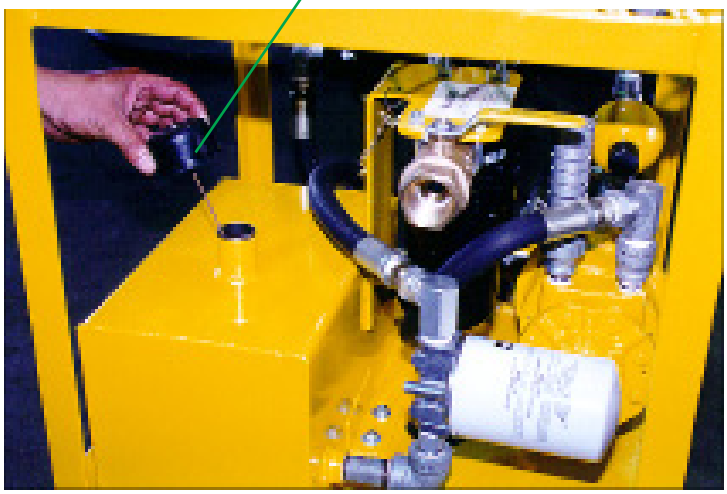
031-P15 Regulator



Air Power Pack Maintenance

Hydraulic Oil Level

1. **Check oil level once per week**
2. Remove hydraulic oil cap (HOC) located on the top of the hydraulic tank. Oil should be maintained at a **level no lower than 3" below the top of the tank,** and **no higher than 1" from the top of the tank**.
3. If the level is too low, add **#10 wt.** foam suppressed **hydraulic oil**.



Changing Oil Filter Cartridge

1. The **Hydraulic filter cartridge** should be **changed** once **every six** (3) **months** of operation.
2. **Unscrew** the hydraulic filter **cartridge** (HFE) and **replace.**

Part Numbers

Part Name	Part #
Filter Element (HFE)	031-P11-1

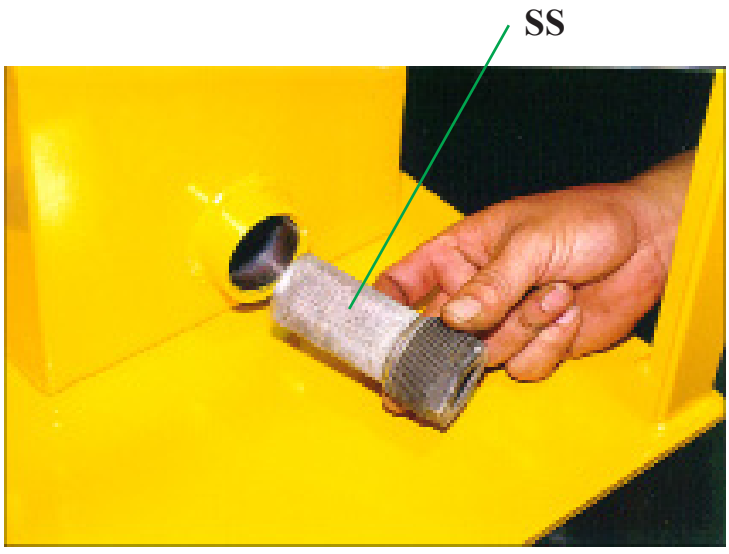
Air Power Pack Maintenance

Change Suction Strainer

1. The hydraulic **tank** should be **cleaned** approximately **once every year** of service.
2. **Remove** the lock **strap** from the tank **valve** (TV) and **rotate clockwise** to the **off position**.
2. **Drain** the hydraulic **tank** first by removing the pump end of the pump suction hose (PSH). Rotate the tank valve (TV) to the on position and drain off old oil.
3. **Unscrew** the other end of the pump **suction hose** from the tank valve (TV), and **remove** the tank valve and the **suction strainer** inside the tank, by **unscrewing** the tank **valve at** the **fitting** (TF) just adjacent to the tank.
4. Thouroghly **clean** the **suction strainer** (SS) with cleaning solvent. Replace if damaged.
5. **Flush out the tank** with cleaning solvent and remove sludge build-up on the bottom of the tank.
6. **Re-install** all **components**.
7. **Replace return** line **filter**. See prior page.
8. **Fill** the **tank** with clean oil.
9. Make sure the **tank valve** (TV) is turned **on** (the position shown in above photo). Lock the valve in the on position with wire.

Part Numbers

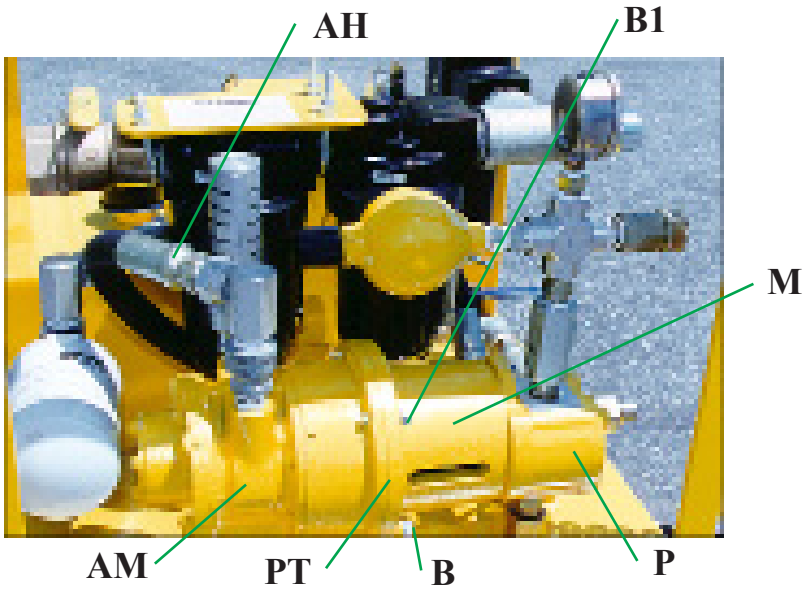
Part Name	Part #
Suction Strainer (SS)	031-P04A

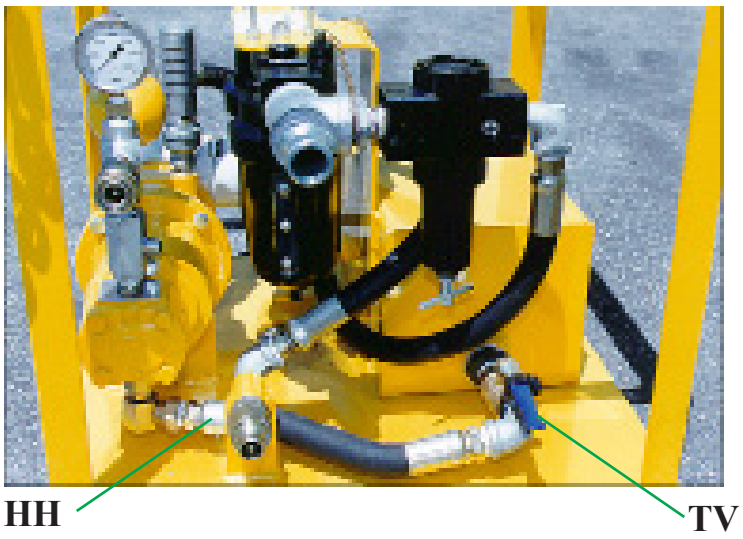


Air Power Pack Maintenance

Repair Power Train

1. **Shut** off **tank valve** (TV)
2. **Disconnect** two **hoses** (AH,HH) from the power train (PT).
3. **Disconnect** the **power train** from the power pack pallet by removing two (2) bolts (B).
4. Remove two (2) bolts (B1) and **separate** the **air motor** (AM) **from** the **Mount** (M).
5. Refer to the **air motor** assembly drawing for appropriate **repair or replacement**. See Drawings pg.64.
6. The rubber **power coupling insert** (CI) between the air motor and the hydraulic pump can now be **changed** if neccessary. See the next page.
7. **Remove** the hydraulic **pump** (P) **from** the **Mount** (M).
8. Now the **hydraulic pump** (P) can be **repaired or replaced**. See drawings pg.66.
9. **See the next page** for information on how to install the coupler halves on the air motor and hydraulic pump.
10. To **install** the hydraulic pump





Continued on next page.

NOTE

To order parts of the power pack assembly, refer to page 68 in the drawings section.

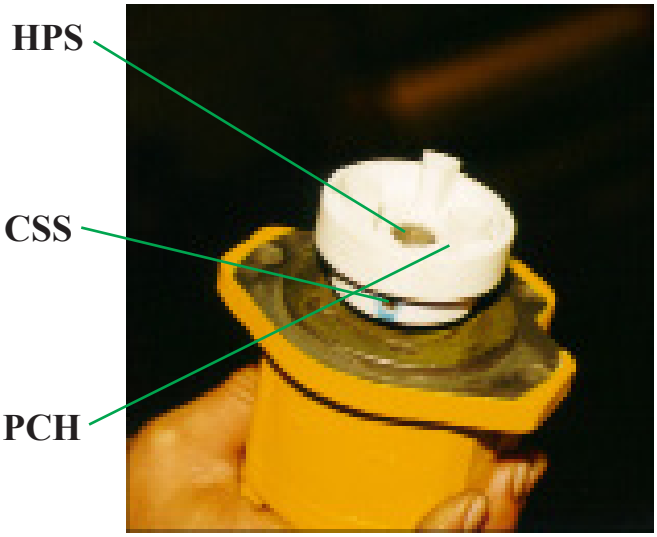
Part Numbers

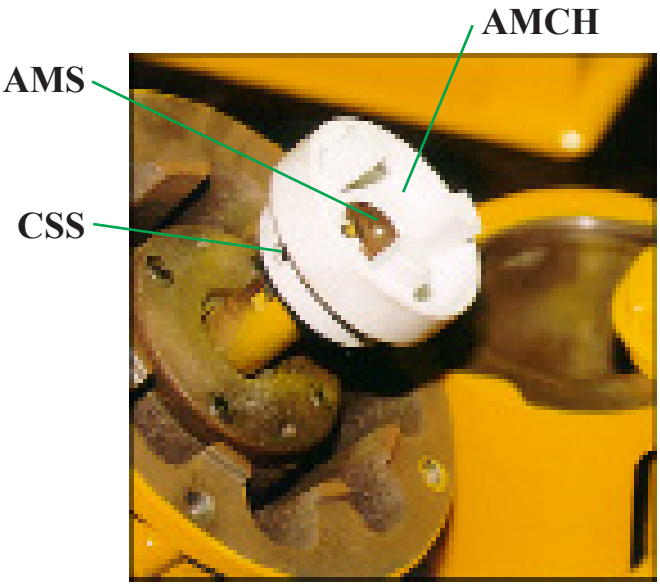
Part Name	Part #
Gear Pump Seal Kit	031-P05-1
Air Motor Repair Kit	031-P16-RK

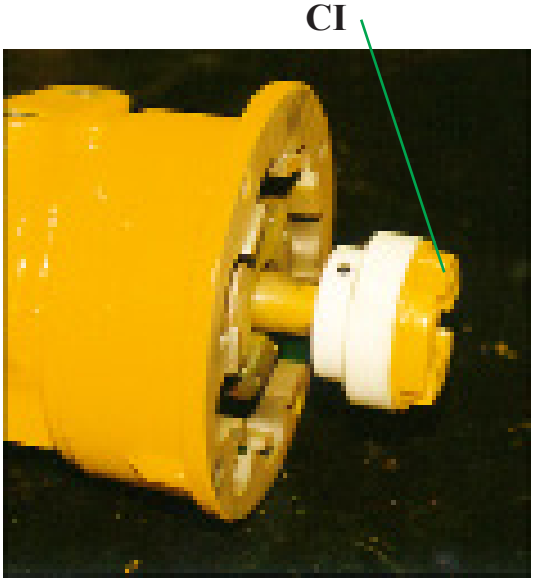
Install Coupler Halves

coupler half (PCH) [1/2" Dia. shaft] correctly, **insert** the pump drive **key** (P/N 031-M21) into its groove **on** the **pump shaft**.

11. **Slide** the **coupler half** (PCH) **on** to the pump **shaft** so that the hydraulic **pump shaft** (HPS) is **flush** with the **flat suface** of the pump **coupler half** (PCH) as shown. **Tighten** the set **screw** (CSS).
12. **Install** the air motor **coupler half** (AMCH) [drive key P/N 031-P16-9] in the same manner as above except leave the air motor **shaft sticking out beyond** the **surface** of the air motor **coupler** surface (**.100" or 2.54mm**). Tighten the set screw (CSS).
13. **Reassemble** the **power train** as shown and **hook up** the **hoses** in there appropriate places. Make sure the **tank valve** is **turned on** and **locked** in the **on position with wire.**







Part Numbers

Part Name	Part #
Pump Coupler(PCH)	031-P06
Air Mtr.Cplr.(AMCH)	031-P07
Coupler Insert (CI)	031-P08

Trouble Shooting Hydraulic Spinmaster

Symptom	Remedy
Actuate <u>any valve</u> and nothing happens.	☐ Make sure the **power unit** is providing the **proper flow** and **pressure** to the Spinmaster. See Power Hook-Up pg. 11. ☐ Check that the **pressure** and **tank** hydraulic line **quick disconnects** are properly and **securely connected**. See Power Hook-Up pg. 11. ☐ If there is a pressure filter on the hydraulic power unit, the **filter** element may be **clogged**. Change the filter element pg.33. ☐ Repair or replace the Spinmaster hydraulic valve. See drawings pg.74.
Actuate the <u>motor valve</u> and nothing happens.	☐ Check that the spinner hydraulic drive **motor quick dissconnects** are **connected securely** and are allowing fluid flow. See Operational Adjustments pg.16. ☐ Spinmaster **chain** may be **rusted**. Check to see that it is flexable and free to move. If the chain needs replacement, See Maintenance and Repair pg.19,23. ☐ Remove the spinner hydraulic drive **motor** and make sure that its shaft **key** is **in place**. See Drawings pg.50,54 if repairs are needed. ☐ Make sure the spinner drive **motor** is **free** to turn. See Drawings pg.50,54 if repairs are needed. ☐ Make sure the **reducer gear box** is **intact** and **free to turn**. See Drawings pg.60 if repairs are needed.
Actuate the <u>Door Valve</u> to grip the pipe and the lever does'nt stay shifted (Detented).	☐ If the door valve lever does'nt stay shifted, the Spinmaster will slip on the pipe. Adjust or replace the door valve detent mechanism. See Repair & Maintenance pg.30.
The Spinner Torque is insufficient to rotate the drill pipe stand.	☐ Make sure the **connection** has been **fully broken** out before trying to spin. ☐ Make sure the **power unit** is providing the proper **flow** and **pressure** to the Spinmaster. See Power Hook-Up pg. 11. ☐ If there is a **pressure** filter on the hydraulic power

Continued on next page.

Symptom	Remedy
The <u>Spinner torque is insufficient</u> to rotate the drill pipe stand. (Continued)	unit, the **filter** element may be **clogged**. Change the filter element. ☐ Make sure **drive rollers** are **<u>not</u> touching** each other when gripped on drill pipe. Adjust Pipe Size pg.14. ☐ Spinmaster **chain** may be **rusted**. Check to see that it is flexable and free to move. If the chain needs attention, See Maintenance and Repair pg.19,23. ☐ Check that the drill pipe connections are within API tolerance. ☐ The drive roller sprocket bearings could be worn out. Check that they are turning freely. Replace them if neccessary. See Maintenance & Repair pg.27. **Note:** Extreme bearing wear could cause bearings to spin on their inner or outer raises making it difficult to remove from their mounting possitions. Replace the drive roller sprocket if neccessary. See Drawings Pg.50,54 ☐ Check the drive roller wear. If the drive roller groove is no longer visible, replace the drive rollers. See Maintenance & Repair pg.25. ☐ The bottom drive shaft flange bearing is worn out. Replace it. See Drawings pg.50,54. ☐ The drive and/or roller sprockets could be worn enough to cause a reduction in performance. Check for irregular shape to the sprocket teeth. For changing sprockets see Drawings pg.50,54. ☐ The reducer could need some attention. If properly lubricated, the reducer is a long term wear item. If all other rotating members on the spinner work correctly, inspect the gears and bearings in the reducer for wear. Replace where neccessary. See Drawings pg.60. ☐ The hydraulic drive motor could be tired. With properly filtered hydraulic fluid, the drive motor is a long term wear item. If all other rotating members on the spinner work correctly, inspect the drive motor rotating group, bearings and seals for wear. Replace where neccessary. See Drawings pg.62. ☐ The spinner is adjusted too large for the drill pipe

Trouble Shooting Hydraulic Spinmaster

Symptom	Remedy
The Spinner slips.	tube. Adjust the spinner to the correct pipe size. See Operating Adjustment pg.14. ☐ The Spinmaster may slip if there is a large amount of grease on the pipe. The slipping will stop after the grease has dissipated. ☐ The Spinmaster door valve lever must detent and stay shifted or the spinner will slip on the pipe body. To adjust or repair the Spinmaster door valve detent on both the air and hydraulic models. See Maintenance & Repair pg.30. ☐ Make sure drive rollers are **not** touching each other when gripped on drill pipe. If the drive rollers are touching each other, adjust the spinmaster to the next smaller (move drive motor back) size setting. If the Spinmaster pops off the pipe when rotating and shouldering the drill pipe, the chain needs to be replaced. See Maintenance & Repair pg.23.
The Spinner Thrusts Off the Pipe While Spinning.	☐ If the pipe size adjustment is too small, the spinner will thrust itself off the pipe. For correct adjustment see Adjust Pipe Size pg.14.
The Chain Wears Out prematurely.	☐ Make sure to lubricate chain on a regular bases. A lack of lubrication causes abnormally fast wear. See Chain Lubrication pg.19. ☐ Running the spinner with worn drive rollers severely shortens chain life. If the drive roller groove is no longer visible, replace the drive rollers. See Changing the Drive Rollers pg.25. Inspect the chain. Replace the chain if the links are worn flat. See Changing the Spinner Chain pg.23. ☐ The drive and/or roller sprockets could be worn enough to cause a reduction in performance. Check for irregular shape to the sprocket teeth. For changing sprockets see Drawings pg.50,54.
The Main Relief Valve makes noise and/or Hydraulic Fluid Heats Up.	☐ If the Spinmaster hydraulic relief valve (located on the motor and door main valve) is set below the maximum pressure of the hydraulic power unit, the relief valve will make a squaking or sqealing

Continued on next page.

Trouble Shooting Hydraulic Spinmaster

Symptom	Remedy
The Main Relief Valve makes noise and/or the Hydraulic Fluid Heats Up. (Continued)	noise and the hydraulic fluid will heat up. To adjust the Spinmaster Relief, See Hydraulic Adjustments pg.12. ☐ Hydraulic fluid will heat up and cause severe damage to the hydraulic power unit and the Spinmaster if a closed center plug is used with an open center hydraulic power unit. Make sure that the Spinmaster main valve is configured with a open centered plug (the Spinmaster comes standard with the open center plug unless otherwise specified) for running a constant volume hydraulic power unit. See Hydraulic Adjustments pg.12. ☐ Check to see if the Spinmaster grip cylinder piston seals are leaking. The cylinders will be hotter than the hydraulic motor if they are leaking internally and the Spinmaster would slow down. To repair the grip cylinders, See Drawings pg.56,58. ☐ The Spinmaster motor could be leaking internally causing the Spinmaster to slow down and the motor would also run hotter than normal. To repair the motor see Drawings pg.62.
The Spimaster Runs Slower than Normal.	☐ Check that the pressure and tank hydraulic line quick disconnects are properly and securely connected. See Power Hook-Up pg. 11. ☐ Make sure the power unit is providing the proper flow. See Power Hook-Up pg. 11. ☐ If there is a pressure filter on the hydraulic power unit, the filter element may be clogged. Change the filter element. ☐ Check to see if the Spinmaster grip cylinder piston seals are leaking. The cylinders will be hotter than the hydraulic motor if they are leaking internally and the Spinmaster would slow down. To repair the grip cylinders, See Drawings pg.56,58. ☐ The Spinmaster motor could be leaking internally causing the Spinmaster to slow down and the motor would also run hotter than normal. To repair the motor see Drawings pg.62.

Continued on next page.

Trouble Shooting Hydraulic Spinmaster

Symptom	Remedy
After installing the Spinmaster, no other hydraulic component on the rig works.	☐ The standard Spinmaster comes with an open center plug in its main valve. If you are running any other hydraulic systems on the rig with the same hydraulic power unit running the Spinmaster, you must replace the standard open center plug with the closed center plug. **"Warning"** ... You must have a closed center (pressure compensated pump) hydraulic power unit if you are going to install the closed center plug. See Hydraulic Adjustments pg.12.

Trouble Shooting Air Spinmaster

Symptom	Remedy
Actuate <u>any valve</u> and nothing happens.	☐ Make sure the Spinmaster Power Pack is attached to an active rig air source, is hooked up to the spinner correctly and is turned on. See Power Hook-up pg.11.
<u>Actuate the Door Valve</u> To Grip the Pipe <u>and nothing happens</u>.	☐ Make sure the Spinmaster Power Pack is attached to an active rig air source, is hooked up to the spinner correctly and is turned on. See Power Hook-up pg.11. ☐ If the spinner doors will not close and grip the pipe, try running the spinner to see if the main air motor is getting air. Run the motor just a short burst, as running the chain without pipe is not good. If the main air motor on the spinner runs, the problem is with the Power Pack. Go to the next step. ☐ Check to see if the small air motor on the Power Pack is rotating. Normally, the small motor should rotate very slowly (almost at a stall) when the Spinmaster is idle. If the air motor is rotating rapidly, the tank valve on the Power Pack may be closed. Check the tank valve setting, see page 36 step #9 for proper setting of the tank valve during operation. Go to next step. ☐ If the air motor is still rotating rapidly, the oil level on the tank should be checked. See Hydraulic Oil Level pg.35. go to the next step. ☐ If the oil level is O.K.,check the suction strainer for clogging. Clean or replace if neccessary. See Changing Suction Strainer pg.36. Go to next step. ☐ If the suction strainer is clean, either the drive keys on the air motor/pump power train are faulty or the pump needs some attention. See Repair Power Train pg.37. ☐ If the air motor is ***<u>not</u>*** turning at all, first check that the regulator adjustment is set correctly, see Adjusting Grip Pressure page 34. If the regulator is set correctly, the air motor could be rusted internally. For repair see Repair Power Train page

Continued on next page.

Symptom	Remedy
Actuate the Door Valve To Grip the Pipe and nothing happens. (Continued)	37. Make sure that the lubricator is full and is metering oil to the air motor. Do this by turning off the main Power Pack valve, removing the main air hose from the Power Pack to the Spinmaster and turning the main valve on again. Air should flow into the atmosphere with a very light oil mist that would coat your hand. Now check the lubricator drip adjustment. If the air lubricator is not functioning correctly, rust could disable the air motor. See Air Lubricator Adjustment Maintenance page 32 .
The Spinner Rotates the Pipe Slower Than Normal and Torque is Insufficient.	☐ Make sure the Power Pack main air valve is fully open. See Power Hook-Up pg.11. ☐ Make sure that the air supply (volume and Pressure) from the rig source is sufficient to get maximum performance from the main Spinmaster motor (250-300 scfm @100 psi). ☐ Make sure that the air hose from the rig air supply to the Spinmaster Power Pack is at least 1 1/4" in size (1 1/2" air hose gives best performance especially when the supply hose is longer than 25 foot) or the Spinmaster air motor will starve for air. See Power Hook-up pg.11. In addition, any fittings that are on the air supply hose to the Power Pack must have equal or greater flow capacity as the supply hose. ☐ The air filter on the Power Pack may be clogged. See Changing Air Filter Element pg.33. ☐ The muffler on the Spinmaster air drive motor could be restricting the air flow through the motor. Clean or replace the muffler. For part number see Drawings pg.48,52. ☐ The gripping pressure output on the Power Pack could be set too high. For proper adjustment, see Adjusting Grip Pressure pg.34. ☐ The drive rollers could be touching one another

Continued on next page.

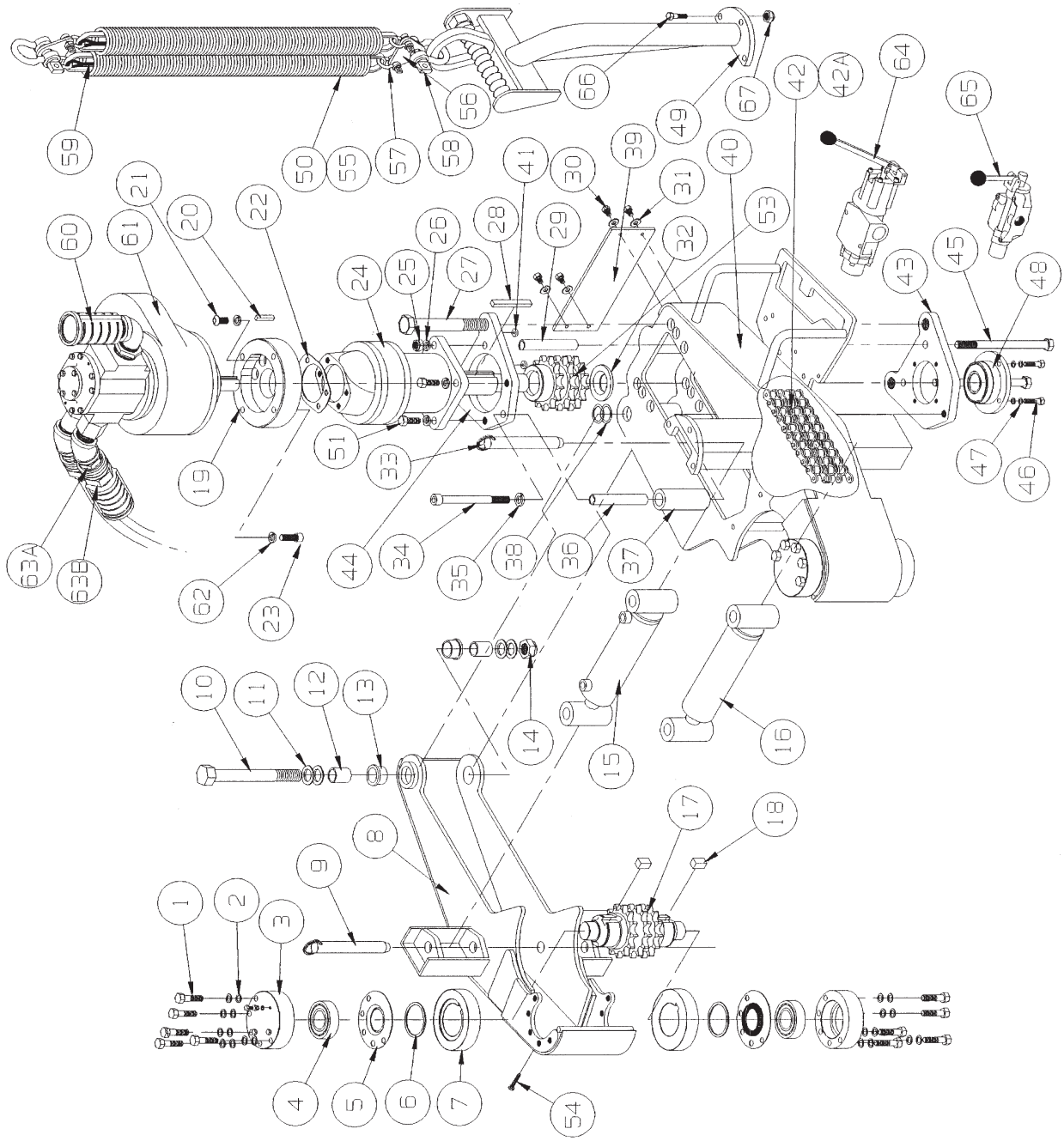
Trouble Shooting Air Spinmaster

Symptom	Remedy
The Spinner Rotates the Pipe Slower Than Normal and Torque is Insufficient.(Continued)	while spinning the pipe. See Adjusting Pipe Size pg.14. ☐ The drive rollers could be warn out. See Changing the Drive Rollers pg25. ☐ The chain could be rusted and tight. See Lubricating the Chain pg.19. ☐ The drive roller sprocket bearings could be warn out. Check that they are turning freely. Replace them if neccessary. See Changing the Drive Roller Sprocket Bearings pg.20. **Note:** Extreme bearing wear could cause bearings to spin on their inner or outer raises making it difficult to remove from their mounting possitions. Replace the drive roller sprocket if neccessary. See Drawings Pg. 48,52 ☐ The drive shaft bearing on the Spinmaster could need Lubrication or replacement. See Lubricating Drive Shaft Bearing pg. 21 or Drawings pg.48,52. ☐ The drive and/or roller sprockets could be worn enough to cause a reduction in performance. Check for irregular shape to the sprocket teeth. For changing sprockets see Drawings pg.48-52. ☐ The Spinmaster main air motor could be need attention. See drawings pg.70. ☐ The Spinmaster reducer gear box could be need attention. See drawings pg.60.
The Spinner Slips.	☐ Check that the air supply pressure to the Power Pack is no more than 100 psi or Spinmaster chain slippage can result. See Power Hook-Up pg.11. ☐ Make sure that the grip pressure setting on the Power Pack is adjusted to at least 1800psi and no more than 2000psi. See Adjusting Grip Pressure pg.34. ☐ See Trouble Shooting "The Spinner Slips" pg.41.
The Chain Wears Out rematurely.	☐ See Trouble Shooting "Chain Wears Out Prematurely" pg.41.
The Spinner Thrusts Off the Pipe While Spinning.	☐ See Trouble Shooting "Spinner Thrusts Off Pipe While Spinning" pg.41.
The Spinmaster Chain Creeps	☐ The Spinmaster motor valve needs repair. The seals

Trouble Shooting Air Spinmaster

Symptom	Remedy
After the Motor Valve is shifted Off. ***Warning*** ***Chain Creep Can Cause injury.***	and/or spool return spring need replacement. See Drawings pg.72.
The Spinmaster performance in cold weather is not up to par.	☐ The Spinmaster motor valve needs repair. Check that the handle assembly is free to pivot. See Drawings pg.72. ☐ The Spinmaster air motors and mufflers are freezing causing reduced performance. Remove lubricator oil from the lubricator bowl and replace with a quality automotive antifreeze. Adjust the air Lubricator drip to a setting that will reduce the freezing tendencies of the air. See Air Lubricator Adjustment pg32.

550 Air Spinmaster



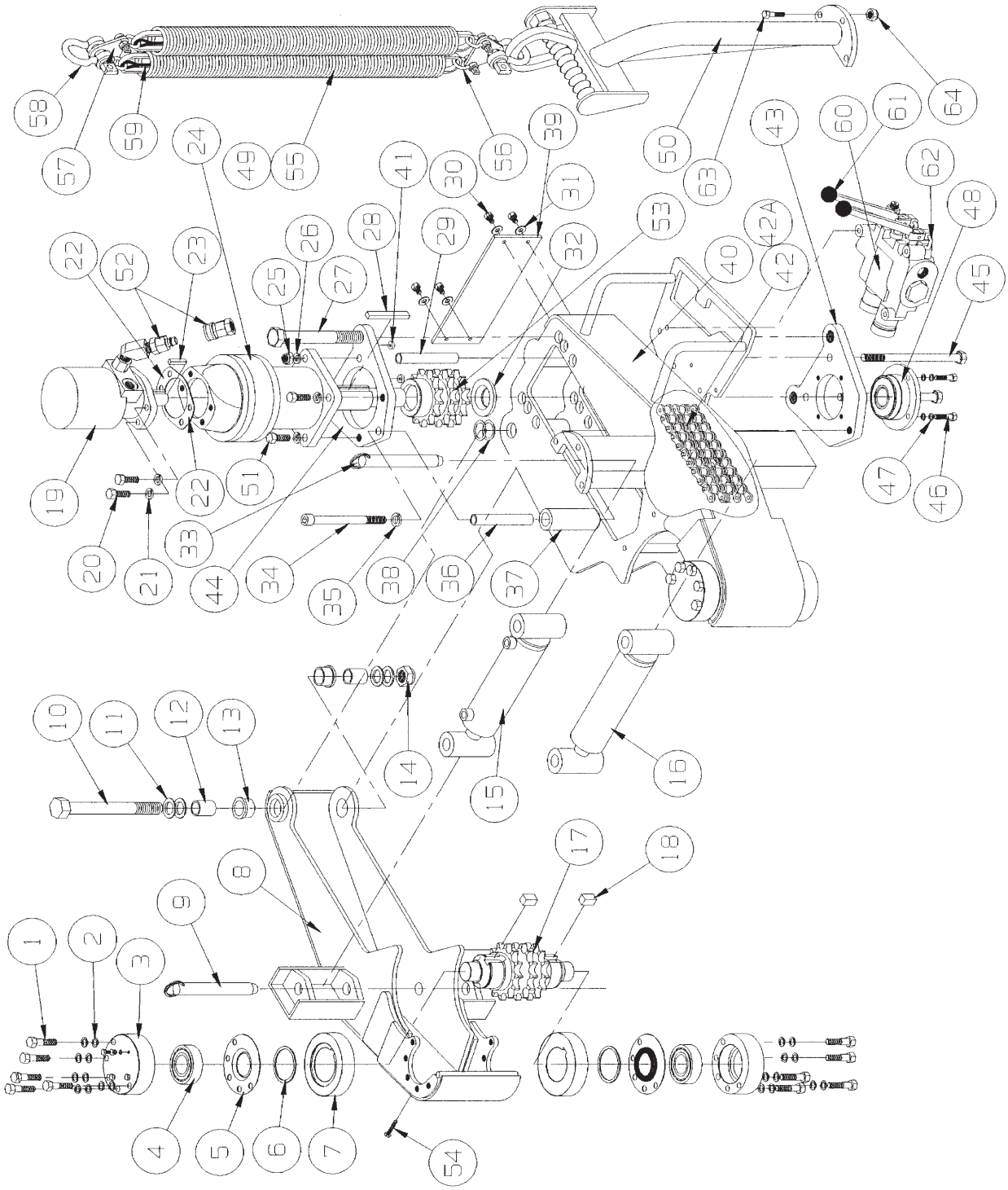
550 Air Spinmaster

Item	Part #	Part Name	Qty/Unit
1	999-806373	Hex Bolt	20
2	031-91074A033	Lock Washer Set	20
3	031-24622	Bearing Cap	4
4	031-24731	Bearing	4
5	031-24654	Bearing Seal	4
6	031-RST-275-S	Snap Ring	4
7	031-24649	Drive Roller	4
8	031-24703	Case Assy , Moving Arm	1
9	031-98404A999	Pin	4
*10	031-91268A935	Hex Bolt	1
*11	061-91074A038	Lock Washer Set	2
*12	031-24637	Bushing	2
*13	031-24729	Flanged Bearing	2
*14	999-806580	Flex Lock Nut	1
15	031-24CYL25AS	Cylinder, Top New (see new stainless rod cyl. parts on page 56)	1
16	031-24CYL25BS	Cylinder, Bottom New (see new stainless rod cyl. parts on page 56)	1
17	031-24623	Roller Sprocket	2
18	031-24643	Key, Roller	4
19	031-24661	Adaptor Flanger	1
20	031-M21	Key, Air Motor	1
21	999-806267	Hex Bolt	4
22	031-M22	Motor Mount Gasket	1
23	999-808450	Soc. Head Cap Screw	4
***24	031-24625	Reducer	1
25	999-806416	Hex Nut	2
26	999-810732	Lock Washer	5
27	031-98404A878	Quick Release Pin (Pin looks different than shown on drawing)	2
28	031-24642	Key, Drive Sprocket	1
29	031-24722	Spacer, Gear Box	3
30	999-805842	Hex Bolt	4
31	999-810589	Flat Washer	4
32	031-24635	Spacer, Drive Sprocket	1
33	031-98404A999	Pin	4
34	031-91251A820	Soc. Head Cap Screw	1
35	999-810732	Lock Washer	5
36	031-24722	Spacer, Gear Box	3
37	031-24658	Chain Guard	1
38	031-95601A435	Fiber Washer	4
39	031-24723	Cover, Rear	1
40	031-24710	Case Assy , Stationary Arm	1
41	031-24646	Wear Block	4
42	031-24CHAIN	Chain	1
42A	031-24CHAINRK	Chain Repair Kit	1
43	031-24702	Mounting Plate	1
44	031-24701	Mounting Plate	1
45	999-806452	Hex Bolt	2
46	999-806025	Hex Bolt	4
47	999-810645	Lock Washer Set	4
48	031-24656	Flanged Bearing	1
49	031-24638	Hanger Assembly	1
50	002-50274	Spring Hanger Assembly	2
51	999-806435	Hex Bolt	2
53	031-24641	Drive Sprocket	1
54	999-806867	Hex Tap Screw SS	1
55	002-CS1-X-28	Hanger Spring	2
56	002-40003	Dual Bracket	2
57	031-G2130-5/16	Shackle	4
58	031-G2130-5/8	Shackle	2
59	002-40010-460-460	Safety Cable Assembly	2
60	031-MUF-1	Exhaust Muffler	2
^61	031-24660	Air Drive Assembly	1
62	999-810703	Lock Washer	8
63A	002-10T40	Air Coupling, Plug	2
63B	002-10S41S	Air Coupling, Socket	2
^^64	002-13170	Motor, Control Valve	1
^^^65	031-25VALVE-A	Hydraulic Door Valve	1
66	999-806268	Hex Bolt	3
67	999-806221	Lock Nut	3

* These parts are available only in kit # 24637-RK.
*** See Drawings, p.60.

^ See Drawings, p.70.
^^ See Drawings, p.77.
^^^ See Drawings, p.81.

550 Hydraulic Spinmaster

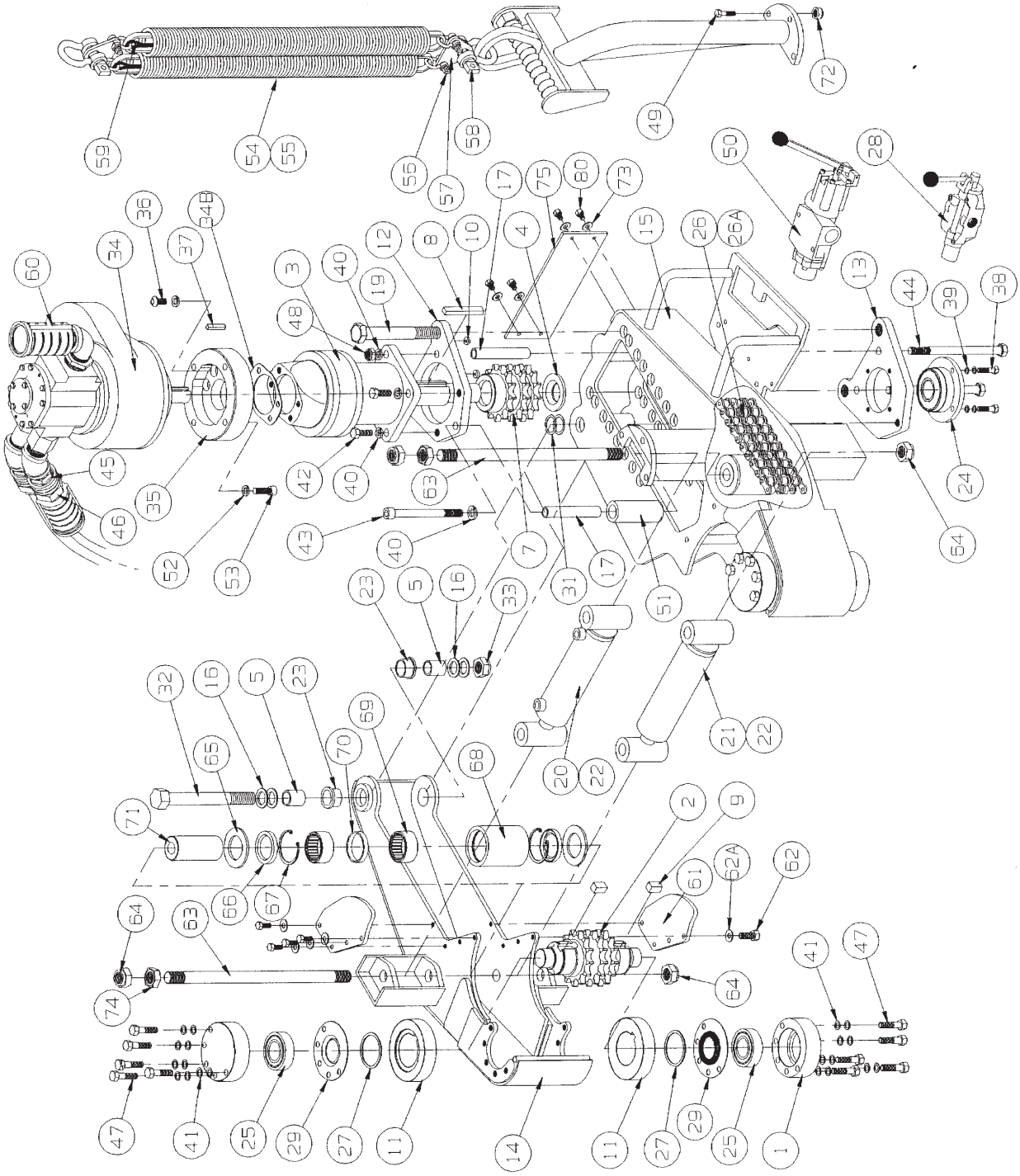


550 Hydraulic Spinmaster

Item	Part #	Part Name	Quantity Per Unit
1	999-806373	Hex Bolt	20
2	031-91074A033	Lock Washer Set	20
3	031-24622	Bearing Cap	4
4	031-24731	Bearing	4
5	031-24654	Bearing Seal	4
6	031-RST-275-S	Snap Ring	4
7	031-24649	Drive Roller	4
8	031-24703	Case Assy., Moving Arm	1
9	031-98404A999	Pin	4
*10	031-91268A935	Hex Bolt	1
*11	061-91074A038	Lock Washer Set	2
*12	031-24637	Bushing	2
*13	031-24729	Flanged Bearing	2
*14	999-806580	Flex Lock Nut	1
15	031-24CYL25AS	Cylinder, Top New (see new stainless rod cyl. parts on page 56)	1
16	031-24CYL25BS	Cylinder, Bottom New (see new stainless rod cyl. parts on page 56)	1
17	031-24623	Roller Sprocket	2
18	031-24643	Key, Roller	4
***19	031-ME09	Hydraulic Motor	1
20	999-806267	Hex Bolt	4
21	999-810703	Lock Washer Set	4
22	031-M22	Motor Mount Gasket	1
23	031-M21	Key	1
****24	031-24625	Reducer	1
25	999-806416	Hex Nut	2
26	999-810732	Lock Washer	5
27	031-98404A878	Quick Release Pin (Pin looks different than shown on drawing)	2
28	031-24642	Key, Drive Sprocket	1
29	031-24722	Spacer, Gear Box	3
30	999-805842	Hex Bolt	4
31	999-810589	Flat Washer	4
32	031-24635	Spacer, Drive Sprocket	1
33	031-98404A999	Pin	4
34	031-91251A820	Soc. Head Cap Screw	1
35	999-810732	Lock Washer	5
36	031-24722	Spacer, Gear Box	3
37	031-24658	Chain Guard	1
38	031-95601A435	Fiber Washer	4
39	031-24723	Cover, Rear	1
40	031-24710	Case Assy., Stationary Arm	1
41	031-24646	Wear Block	4
42	031-24CHAIN	Chain	1
42A	031-25CHAINRK	Chain Repair Kit	1
43	031-24702	Mounting Plate	1
44	031-24701	Mounting Plate	1
45	999-806452	Hex Bolt	2
46	999-806025	Hex Bolt	4
47	999-810645	Lock Washer Set	4
48	031-24656	Flanged Bearing	1
49	002-50274	Spring Hanger Assembly	2
50	002-24638	Hanger Assembly	1
51	999-806435	Hex Bolt	2
52	See Part Name	031-VHN8-8F Nipple(Male) 031-VHC8-8F Coupler(Female)	2each
53	031-24641	Drive Sprocket	1
54	999-806867	Hex Tap Screw SS	1
55	002CS1-X-28	Hanger Spring	2
56	031-G2130-5/16	Shackle	4
57	002-40003	Dual Bracket	2
58	031-G2130-5/8	Shackle	2
59	002-40010-460	Safety Cable Assembly	2
^60	031-522VALVE	Main Hydraulic Valve	1
61	031-660150001	Hydraulic Valve Handle	2
62	031-660150018	Hydraulic Valve Handle Linkage Kit	2
63	999-806268	Hex Bolt	3
64	999-806221-500	Lock Nut	3

* These parts are available only in kit # 24637-RK.
** See Drawings, p.62.
*** See Drawings, p.60.
^ See Drawings, p.74.

950 Air Spinmaster



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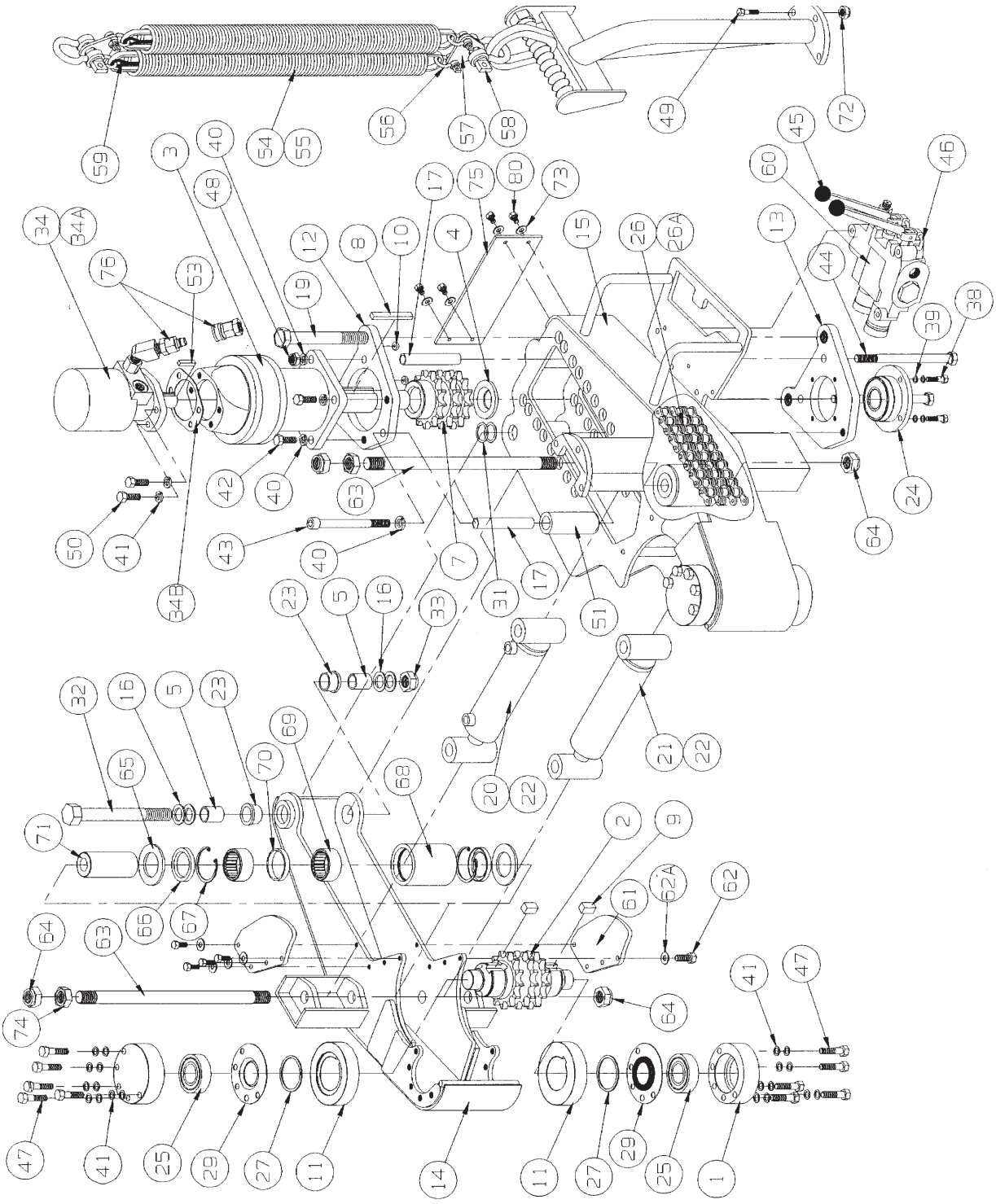
1	031-24622	Bearing Cap	4
2	031-24623	Roller Sprocket	2
***3	031-24625	Reducer	1
4	031-24635	Spacer, Drive Iprocket	1
*5	031-24637	Bushing	2
7	031-24641	Drive Sprocket	1
8	031-24642	Key, Drive Sprocket	1
9	031-24643	Key, Roller	4
10	031-24646	Wear Block	4
11	031-24649	Roller	4
12	031-24701	Mounting Plate	1
13	031-24702	Mounting Plate	1
14	031-25703	Case Assy., Moving Arm	1
15	031-25710	Case Assy., Stationary Arm	1
*16	061-91074AQ38	Lock Washer Set	2
17	031-24722	Spacer, Gear Box	3
19	031-98404A878	Quick Release Pin (pin looks different than shown on drawing)	2
20	031-25CYL25AS	Cylinder Top New (see new stainless cylinder parts on page 58)	1
20A	061-25CYL-AF	Top Cylinder Fitting Kit	N/A
21	031-25CYL25BS	Cylinder,Bottom New (see new stainless cylinder parts on page 59)	1
21A	061-25CYL-BF	Bottom Cylinder Fitting Kit	N\A
22	031-24CYL25RK	Cylinder Seal Kit	N/A
23	031-24729	Flanged Bearing	2
24	031-24656	Flanged Bearing	1
25	031-24731	Sphere-Rol Bearing	4
26	031-25CHAIN	Chain	1
26A	031-25CHAINRK	Chain Repair Kit	1
27	031-RST-275-S	Retainer Ring	4
^28	031-25VALVE-A	Hydraulic Door Valve	1
29	031-24654	Bearing Seal	4
*31	031-956OIA435	Fiber Washer	4
*32	031-91268A935	Hex Bolt	1
*33	031-31FKF1608	Flex Lock Nut	1
^^34	031-24660	Air Drive Assembly	1
34B	031-M22	Motor Mount Gasket	1
35	031-24661	Adaptor Flange	1
36	999-806267	Hex Bolt	4
37	031-M21	Key, Air Drive Motor	1
38	999-806025	Hex Bolt	4
39	999-810645	Lock Washer	4
40	999-810732	Lock Washer	5
41	031-91074AQ33	Lock Washer Set	20
42	999-806435	Hex Bolt	2
43	031-91251A820	Soc. Hwad Cap Screw	1
44	999-806452	Hex Bolt	2
45	002-10T40	Air Coupling, Plug	2
46	002-10S41SL	Air Coipling, Socket	2
47	999-806373	Hex Bolt	20
48	999-806416	Hex Nut	2
49	999-806268	Hex Nut	3
^^^50	002-13170	Motor Control Valve	1
51	031-24658	Chain Guard	1
52	999-810703	Lock Washer	8
53	999-808450	Soc. Head Cap Screw	4
54	002-50274	Hanger Spring Assembly	1
55	002-CS1-X-28	Hanger Spring	2
56	031-G2130-5/16	Shackle	4
57	002-40003	Dual Bracket	2
58	031-G2130-5/8	Shackle	2
59	002-40010-460	Safety Cable	2
60	031-MUF-1	Exhaust Muffler	2
61	031-25720	Safety Cover	4
62	999-806003	Hex Bolt	8
62A	999-810648	Flat Washer	8
63	031-25725	Pin	8
64	999-806594-500	Flex Nut	2
65	031-25722	Spacer, Idler Roller	4
66	031-25721-S	Seal, Idler Roller	4
67	031-25721-RR	Retainer Ring, Idler Roller	4
68	031-25721	Idler Roller	4
69	031-25721-B	Bearing, Idler Roller	2
70	031-25724	Bearing Spacer, Idler Roller	4
71	031-25723	Idler Bushing	2
72	999-806221-500	Lock Nut	3
73	999-810589	Flat Washer	2
74	999-806586	Jam Nut	4
75	031-24723	Cover, Rear	1
80	999-805842	Hex Bolt	5

*** See Drawings, p.60.

^ See Drawings, p.81.
^^ See Drawings, p.70.
^^^ See Drawings, p.77.

950 Hydraulic Spinmaster



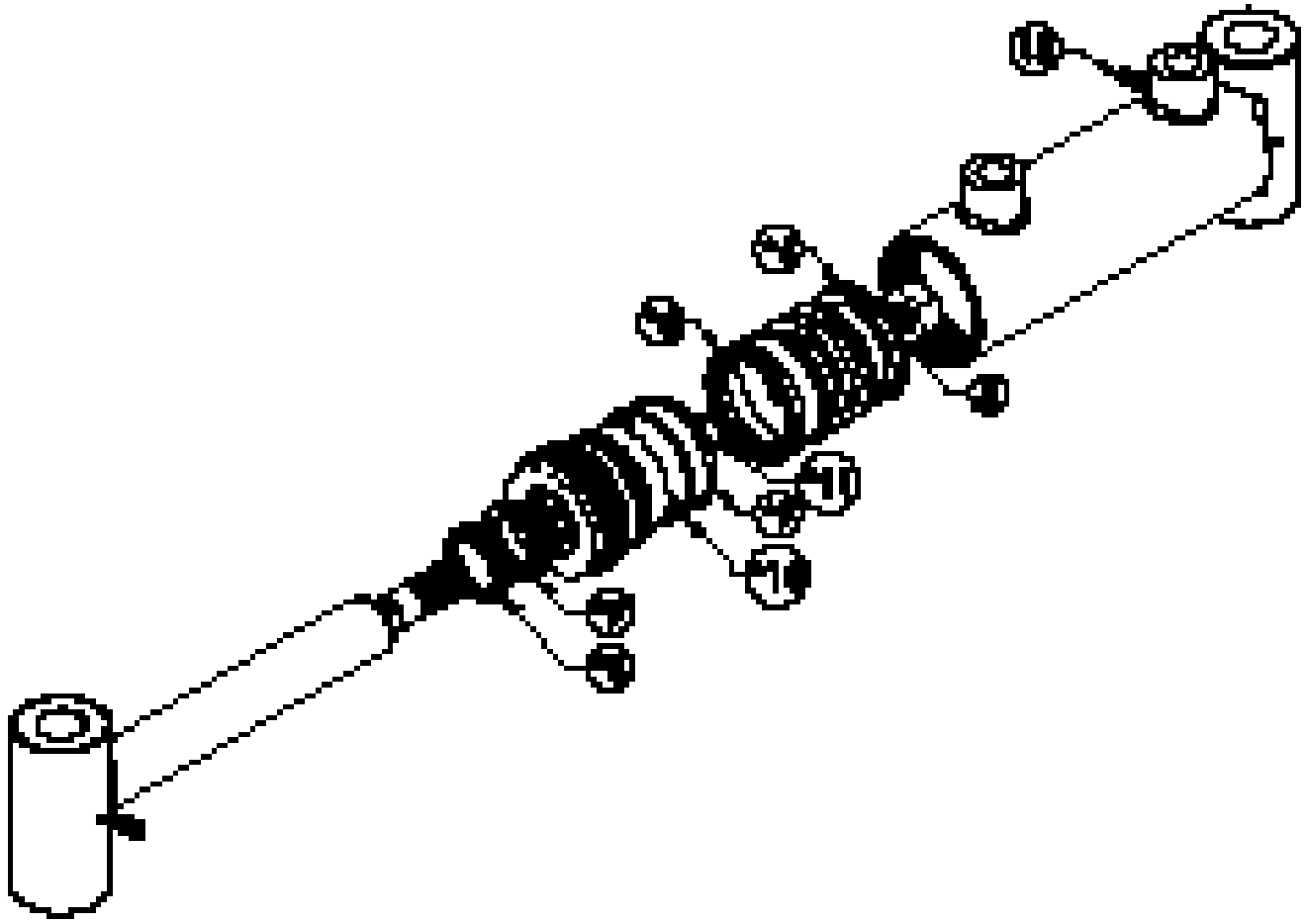
950 Hydraulic Spinmaster

Item	Part #	Part Name	Quantity Per Unit
1	031-24622	Bearing Cap	4
2	031-24623	Roller Sprocket	2
***3	031-24625	Reducer	1
4	031-24635	Spacer, Drive Iprocket	1
*5	031-24637	Bushing	2
7	031-24641	Drive Sprocket	1
8	031-24642	Key, Drive Sprocket	1
9	031-24643	Key, Roller	4
10	031-24646	Wear Block	4
11	031-24649	Roller	4
12	031-24701	Mounting Plate	1
13	031-24702	Mounting Plate	1
14	031-25703	Case Assy., Moving Arm	1
15	031-25710	Case Assy., Stationary Arm	1
*16	061-91074AO38	Lock Washer Set	2
17	031-24722	Spacer, Gear Box	3
19	031-98404A878	Quick Release Pin (pin looks different than shown on drawing)	2
20	031-*25CYL25AS	Cylinder,TopNew (see new stainless cylinder parts on page 58)	1
20A	061-*25CYL-AF	Top Cylinder Fitting Kit	N/A
21	031-*25CYL25BS	Cylinder,Bottom New (see new stainless cylinder parts on page 59)	1
21A	061-*25CYL-BF	Bottom Cylinder Fitting Kit	N\A
22	031-*24CYL25RK	Cylinder Seal Kit	N/A
23	031-24729	Flanged Bearing	2
24	031-24656	Flanged Bearing	1
25	031-24731	Sphere-Rol Bearing	4
26	031-25CHAIN	Chain	1
26A	031-24CHAIN-RK	Chain Repair Kit	1
27	031-RST-275-S	Retainer Ring	4
29	031-24654	Bearing Seal	4
*31	031-956OlA435	Fiber Washer	4
*32	031-91268A935	Hex Bolt	1
*33	031-31FKE1608	Flex Lock Nut	1
****34	061-ME09	Hydraulic Motor	1
****34A	061-Hl6-F	Hydraulic Motor Fitting Kit	N/A
34B	031-M22	Motor Mount Gasket	1
38	999-806025	Hex Bolt	4
39	999-810645	Lock Washer	4
40	999-810732	Lock Washer	5
41	031-91074AO33	Lock Washer Set	20
42	999-806435	Hex Bolt	2
43	031-91251A820	Soc. Head Cap Screw	1
44	999-806452	Hex Bolt	2
45	031-660150001	Handle, Hydraulic Valve	2
46	031-660150018	Linkage Kit, Hydraulic Valve	2
47	999-806373	Hex Bolt	20
49	999-806268	Hex Bolt	3
48	999-806416	Hex Nut	2
50	999-806267	Hex Bolt	4
51	031-24658	Chain Guard	1
53	031-M21	Key, Hydraulic Motor	1
54	002-50274	Hanger Spring Assembly	1
55	002-CS1-X-28	Hanger Spring	2
56	031-G2130-5/16	Shackle	4
57	002-40003	Dual Bracket	2
58	031-G2130-5/8	Shackle	2
59	002-40010-460	Safety Cable	2
^60	031-522VALVE	Main Hydraulic Valve	1
61	031-25720	Safety Cover	2
62	999-806003	Hex Bolt	8
62A	999-810648	Flat Washer	8
63	031-25725	Pin	2
64	999-806594-500	Flex Nut	4
65	031-25722	Spacer, Idler Roller	4
66	031-25721-S	Seal, Idler Roller	4
67	031-25721-RR	Retainer Ring, Idler Roller	4
68	031-25721	Idler Roller	2
69	031-25721-B	Bearing, Idler Roller	4
70	031-25724	Bearing Spacer, Idler Roller	2
71	031-25723	Idler Bushing	2
72	999-806221	Hex Bolt	3
73	999-810589	Flat Washer	4
74	999-806586	Jam Nut	2
75	031-24723	Cover, Rear	1
76	See Part Name	031-VHN8-8F Nipple(Male) 031-VHC8-8F Coupler(Female)	2 each

* These parts are available only in kit # 031-24637-RK.
*** See Drawings, p.60.
**** See Drawings, p.62.

^ See Drawings, p.74.

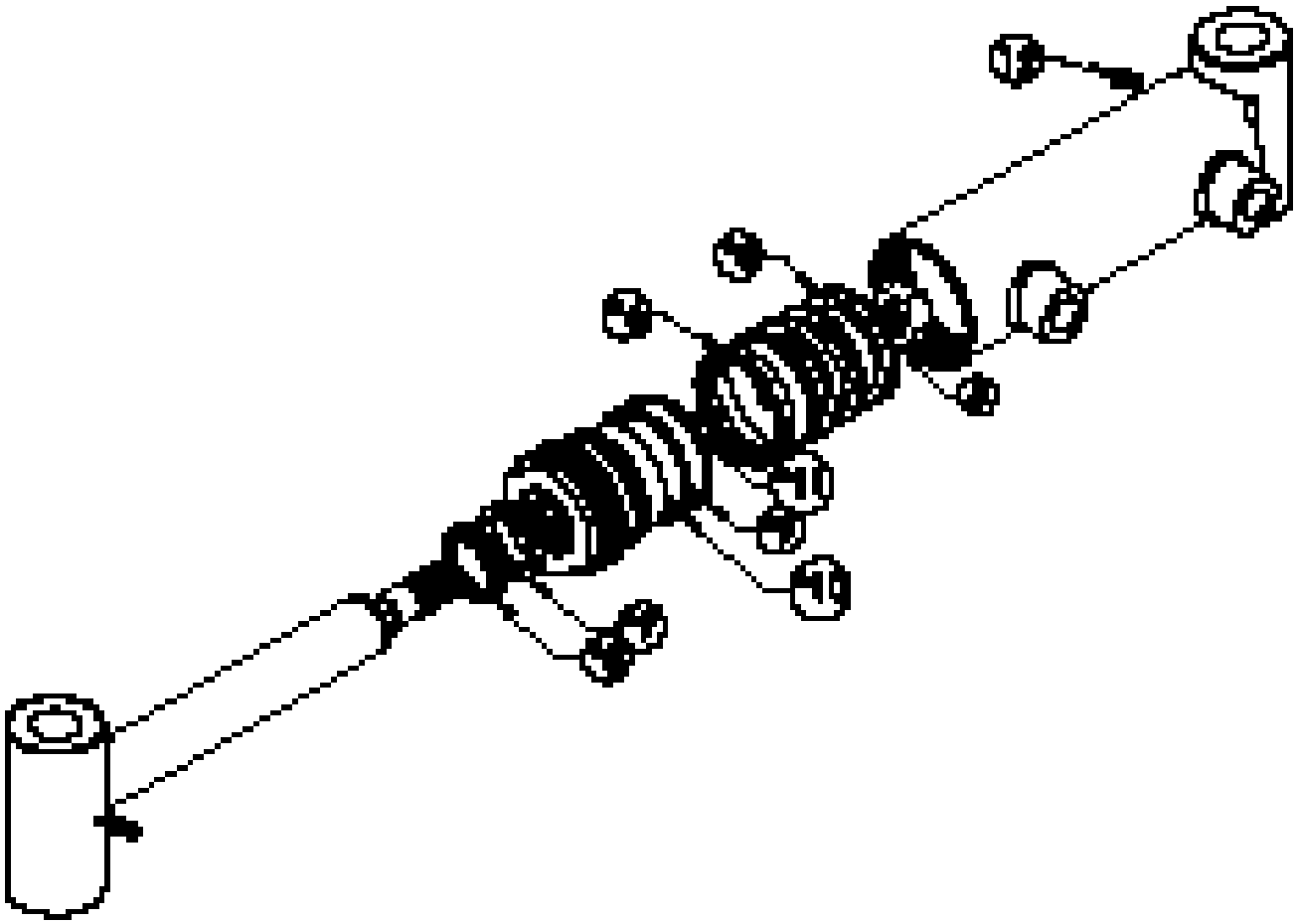
031-24CYL-25-AS Grip Cylinder



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1		[illegible]	1
2		[illegible]	1
3		[illegible]	1
4		[illegible]	1
5	[illegible]	[illegible]	1
*6	[illegible]	[illegible]	2
*7	[illegible]	[illegible]	1
*8	[illegible]	[illegible]	1
*9	[illegible]	[illegible]	1
*10	[illegible]	[illegible]	1
*11	[illegible]	[illegible]	1
12	[illegible]	[illegible]	2

*SEALS ARE AVAILABLE ONLY IN SEAL KIT #031-*24CYL25-RK

031-24CYL-25-BS Grip Cylinder



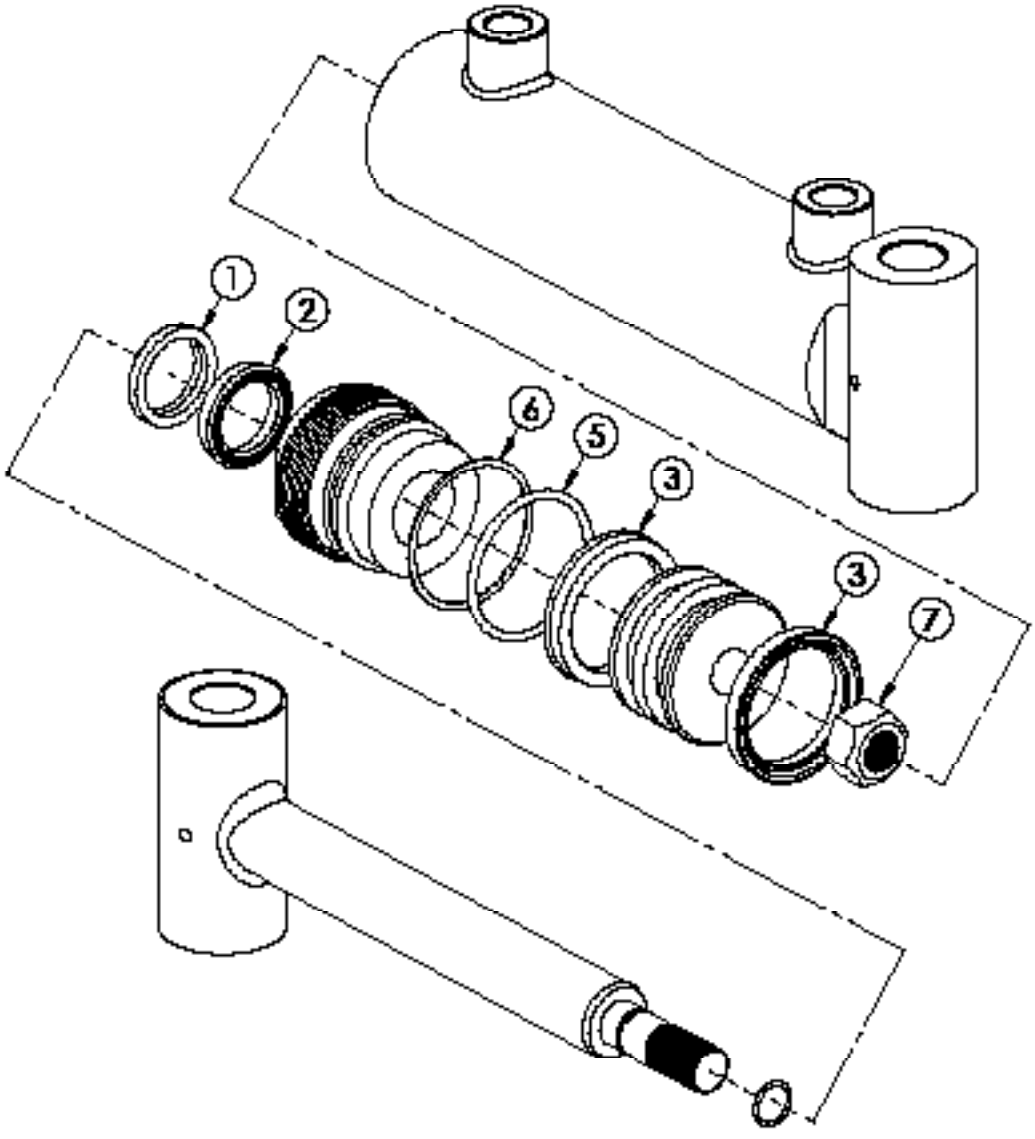
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1		LOCK BARREL ASSY (BOTTOM) FOR 4.04 STROKE	1
2		ROD ASSY. FOR 5.44 STROKE	1
3		PISTON, SOLID POSE	1
4		SOLID POSE SEAL RETAINER, THREAD-IN	1
5	[illegible]	6-4*44 CONICAL TOP LOCK NUT	1
*6	[illegible]	PISTON SEAL 2.00x3	2
*7	[illegible]	ROD SEAL	1
*8	CHD-1000	ROD WIPER	1
*9	[illegible]	O-RING, GLAND	1
*10	[illegible]	BACK-UP RING, 2.00x3	1
*11	[illegible]	ROD PISTON SEAL	1
12	[illegible]	CYLINDER WITH SOLID STRAIGHT	1

*SEALS ARE AVAILABLE ONLY IN SEAL KIT #031-*24CYL25-RK

031-25CYL-25-AS Grip Cylinder

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	▪	ROD WIPER	1
2	▪	ROD SEAL	1
3	▪	U-CUP	2
4	▪	O-RING	1
5	▪	O-RING, HEAD	1
6	▪	BACK UP RING	1
7	20008	3/4"-16 CONICAL TOP LOCK NUT	1

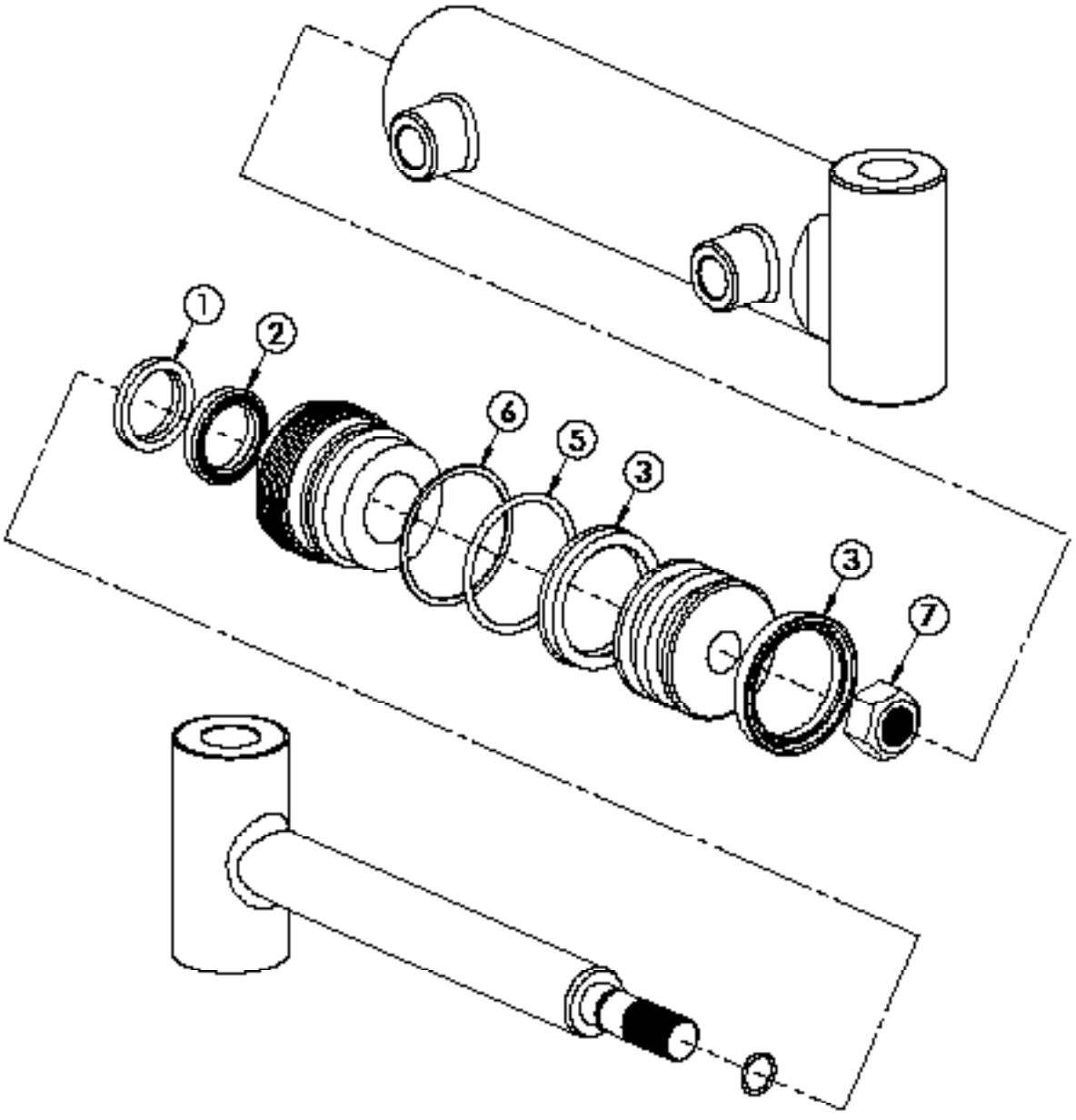
▪ SEALS ARE AVAILIBLE ONLY IN SEAL KIT #031-24CYL25-RK



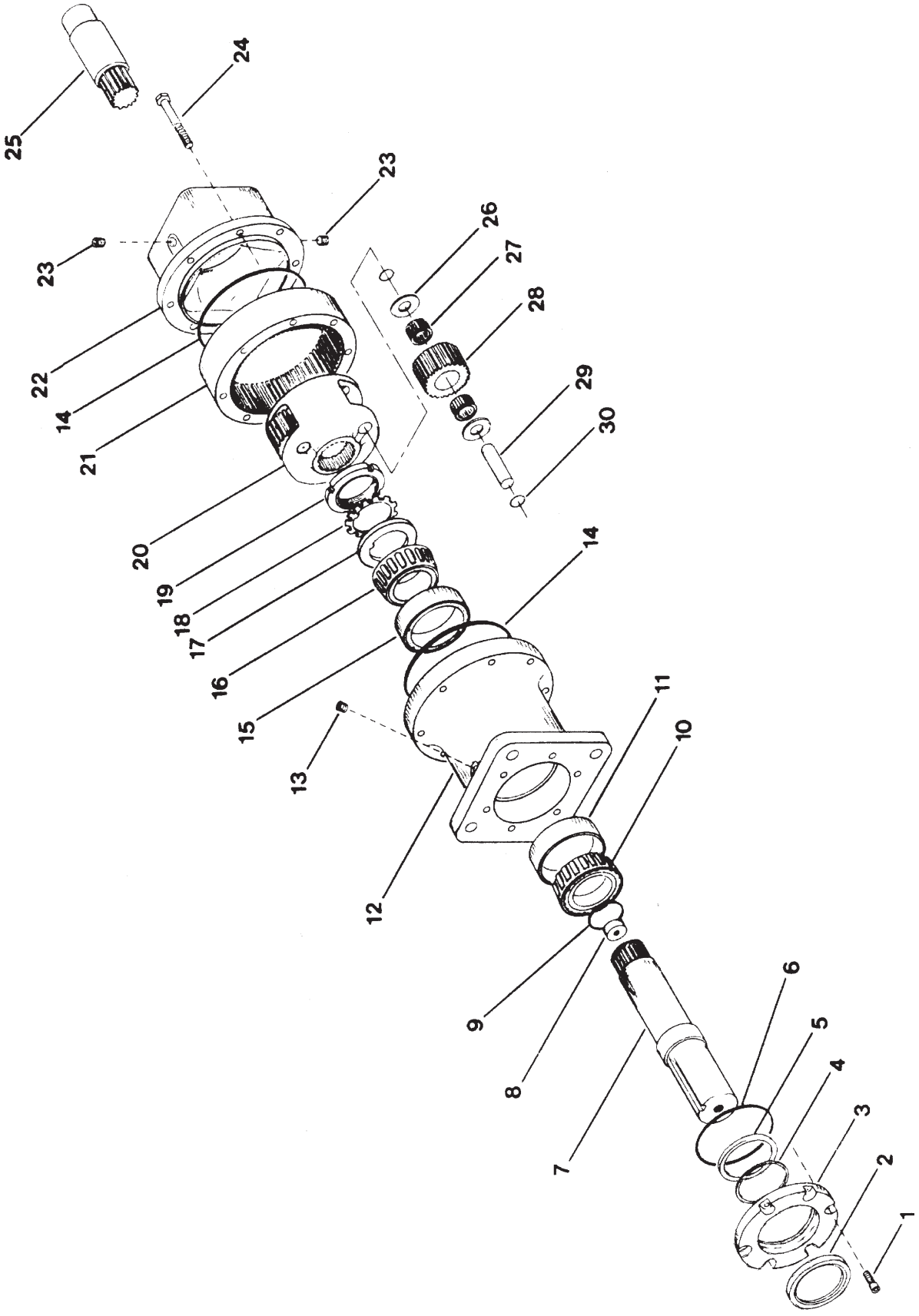
031-25CYL-25-BS Grip Cylinder

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
7	20008	3/4"-16 CONICAL TOP LOCK NUT	1
6	*	BACK UP RING	1
5	*	O-RING, HEAD	1
4	*	O-RING	1
3	*	U-CUP	2
2	*	ROD SEAL	1
1	*	ROD WIPER	1

* SEALS ARE AVAILIBLE ONLY IN SEAL KIT #031-24CYL25-RK



031-24625 Reducer Gear Box



031-24625 Reducer Gear Box

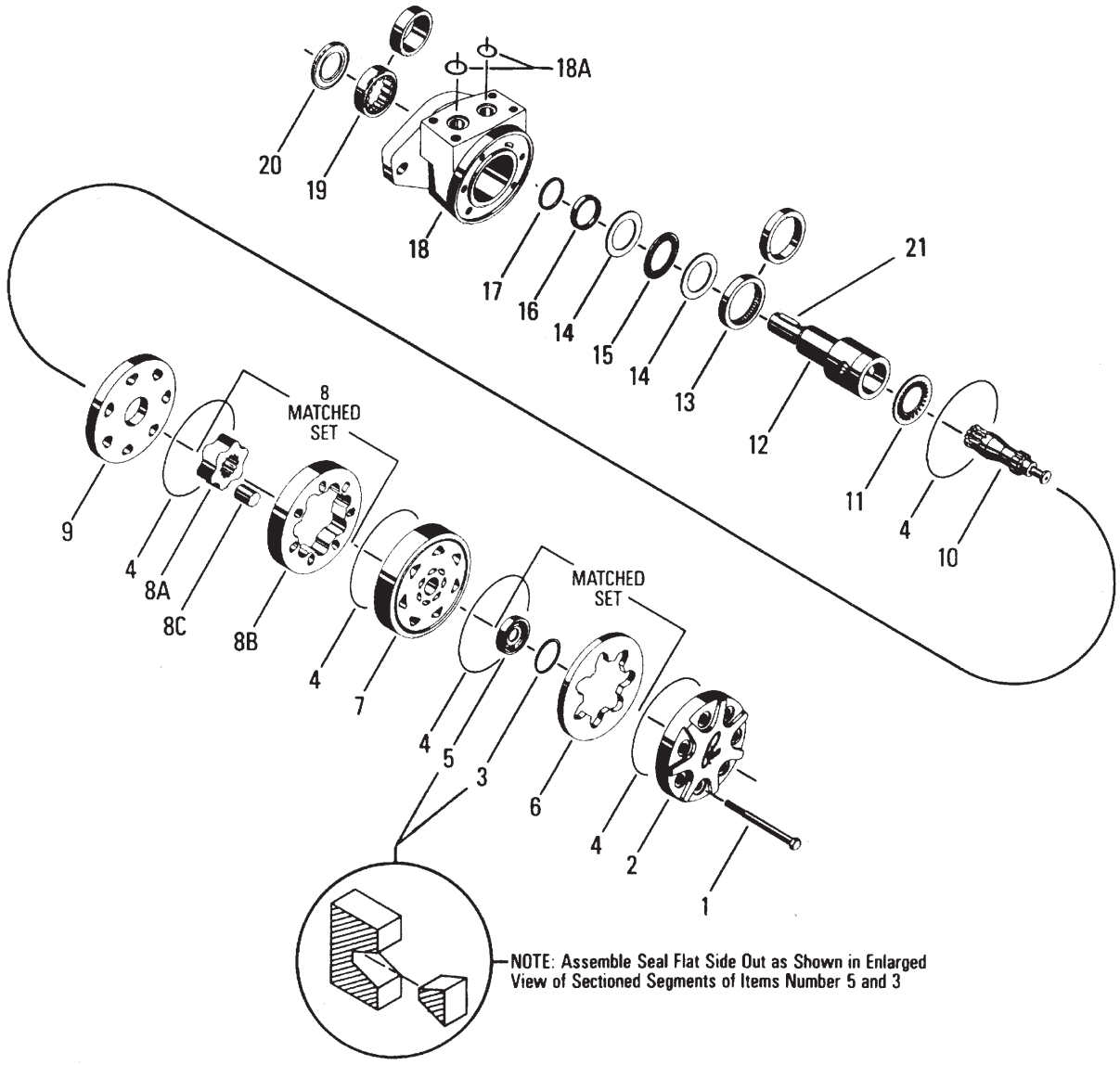
Item	Part #	Part Name	Quantity Per Unit
1	031-R01	Cap Screw	1
2*	031-R02	Shaft Seal	1
3	031-R03	Seal Carrier	1
4*	031-R04	Back-up Ring	1
5*	031-R05	Quad Ring	1
6*	031-R06	"O" Ring	1
7	031-24707	Output Shaft	1
8	031-R08	Thrust Washer	1
9	031-R09	Retainer Ring	2
10	031-R10/16	Cone	1
11	031-R11/15	Cup	1
12	031-R12	Bearing Housing	1
13	031-R13	Pipe Plug	4
14*	031-R14	"O" Ring	2
15	031-R11/15	Cup	1
16	031-R10/16	Cone	1
17	031-R17	Keyed Washer	1
18	031-R18	Lock Washer	1
19	031-R19	Lock Nut	1
20**	031-R34	Planet Carrier	1
21	031-R21	Internal Gear	1
22	031-R22	Motor Adapter	2
23	031-R23	Pipe Plug	4
24	031-R24	Bolt	1
25	031-R25	Sun Gear Kit	1
26**	031-R26	Thrust Washer	2
27**	031-R33	Planet Bearing	2
28**	031-R32	Planet Gear	1
29**	031-R35	Planet Pin	1
30**	031-R36	Retainer Ring	2

NOTE

* These parts come only in a kit. Part # 031-24625-SRK includes these parts and quantities noted.

** These parts are available in 031-R39 planetary assy kit only.

031-ME09 Hydraulic Motor



031-ME09 Hydraulic Motor

Item	Part #	Part Name	Quantity Per Unit
1	031-M01	Special Bolts	7
2	031-M02	End Cover	1
3*	031-M03	Seal Ring-Commutator	1
4*	031-M04	Seal Ring	5
5	031-M05	Commutator Assembly	1
6	031-M06	Commutator Assembly	1
7	031-M07	Manifold	1
8	031-M08	Rotor Set	1
9	031-M09	Wear Plate	1
10	031-M10	Drive Link	1
11	031-M11	Thrust Bearing	1
12	031-M12	Coupling Shaft	1
13**	031-M13	Inner Bearing	1
14**	031-M14	Thrust Washer	1
15**	031-M15	Thrust Bearing	2
16*	031-M16	Inner Seal	1
17*	031-M17	Backup Washer	1
18**	031-M18	Service Housing Assy.	1
19**	031-M19	Outer Bearing	1
20*	031-M20	Dirt & Water Seal	1
21	031-M21	Key	1

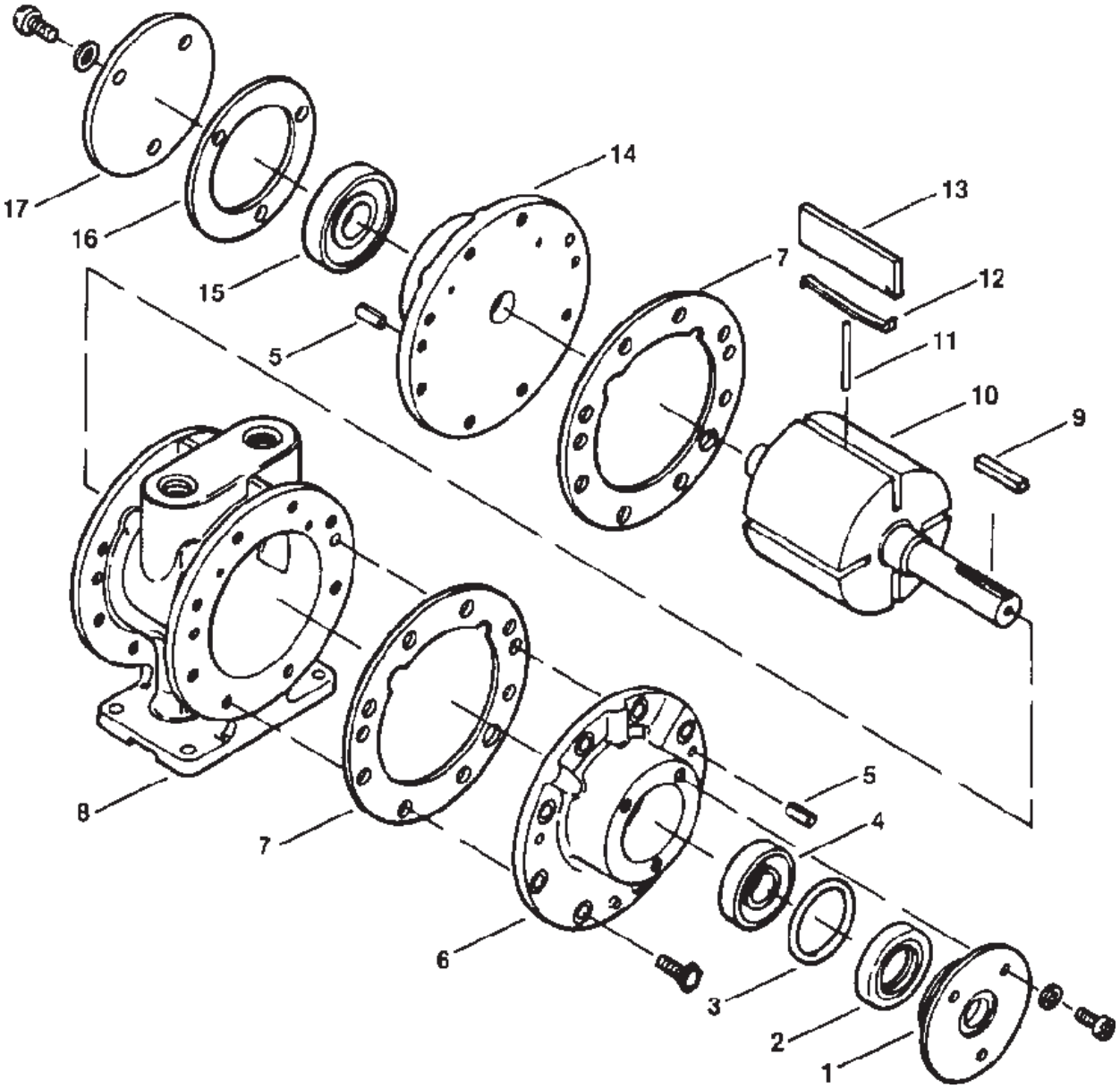
NOTE

* These parts come only in a kit. Part # 031-ME09-RK includes these parts and quantities noted.

NOTE

**These parts come with housing assembly # 031-M18 also.

P-16 Power Pack Air Motor



P-16 Power Pack Air Motor

Item	Part #	Part Name	Quantity Per Unit
1	031-P16-1	End Cap, Drive	1
2*	031-P16-2	Seal	1
3*	031-P16-3	"O" Ring	1
4*	031-P16-4	Bearing, Drive End	1
5	031-P16-5	Dowel Pin	4
6	031-P16-6	End Plate, Drive	1
7*	031-P16-7	Body Spacer Gasket	2
8	031-P16-8	Body	1
9	031-P16-9	Drive Key	1
10	031-P16-10	Rotor Assy.	1
11*	031-P16-11	Push Pin	4
12*	031-P16-12	Vane Spring	8
13*	031-P16-13	Vane	8
14	031-P16-14	End, Plate Dead	1
15*	031-P16-15	Bearing, Dead End	1
16*	031-P16-16	End Cap Gasket	1
17	031-P16-17	End Cap, Dead	1

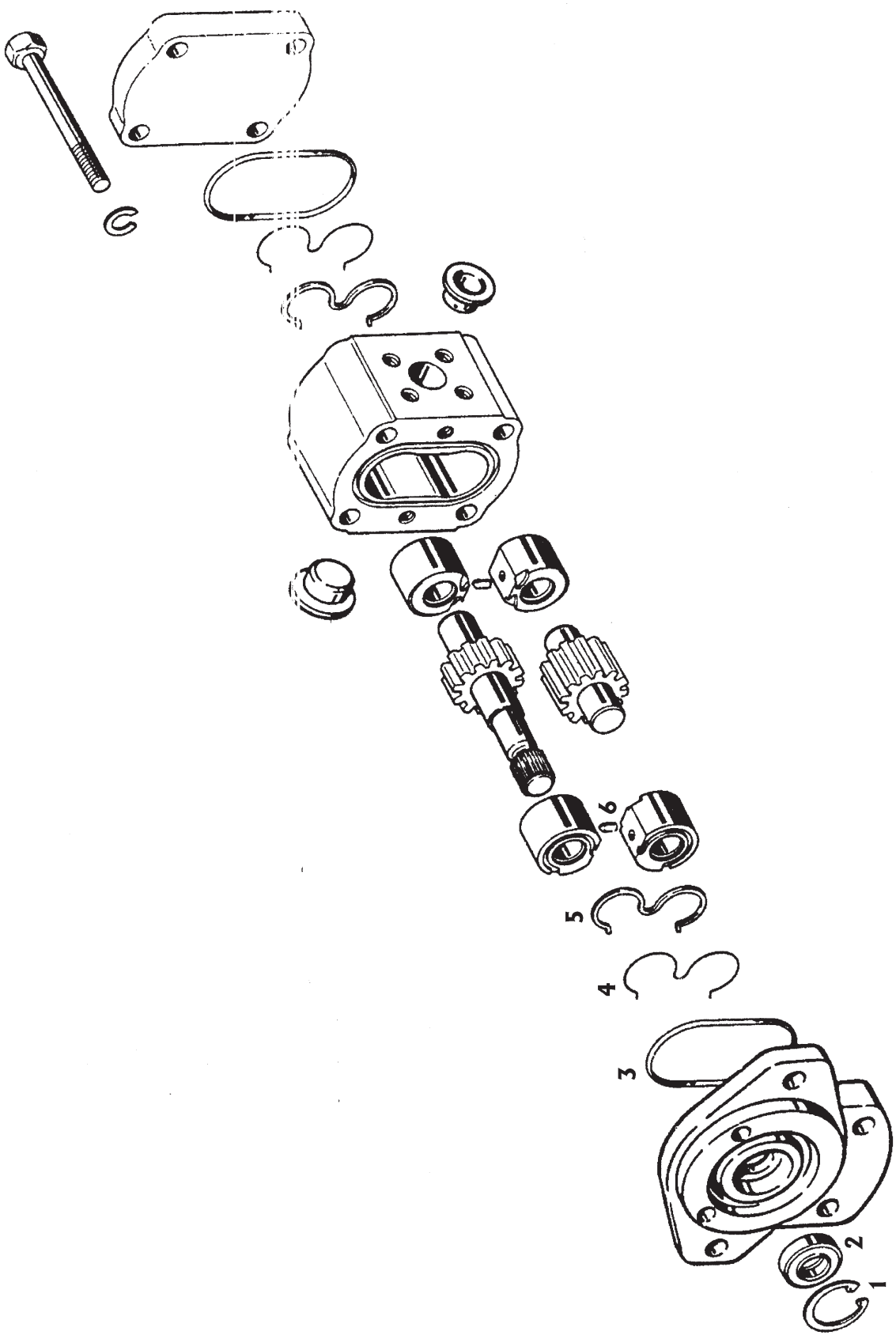
NOTE

* These parts come only in a kit. Part # 031-P16-RK includes these parts and quantities noted.

NOTE

Item #6 has different configuration than shown.

031-P05 Gear Pump



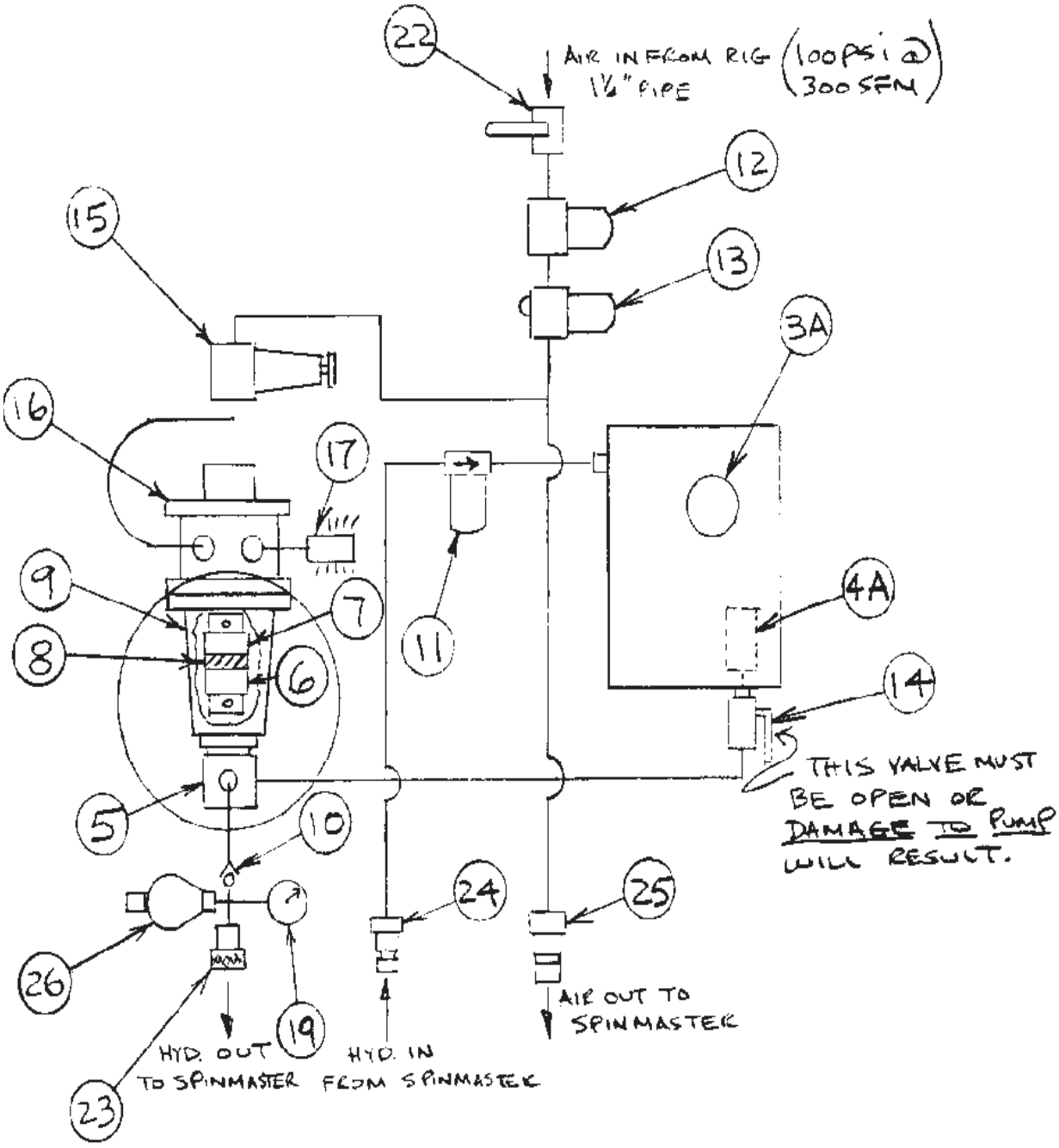
031-P05 Gear Pump

Item	Part #	Part Name	Quantity Per Unit
1*	N/A	Retainer Ring	1
2*	N/A	Shaft Seal	1
3*	N/A	Seal	2
4*	N/A	Seal	2
5*	N/A	Seal	2
6*	N/A	Key	2

NOTE

* These parts come only in a kit. Part # 031-P05-1 includes these parts and quantities noted.

550-PP Power Pack Assembly

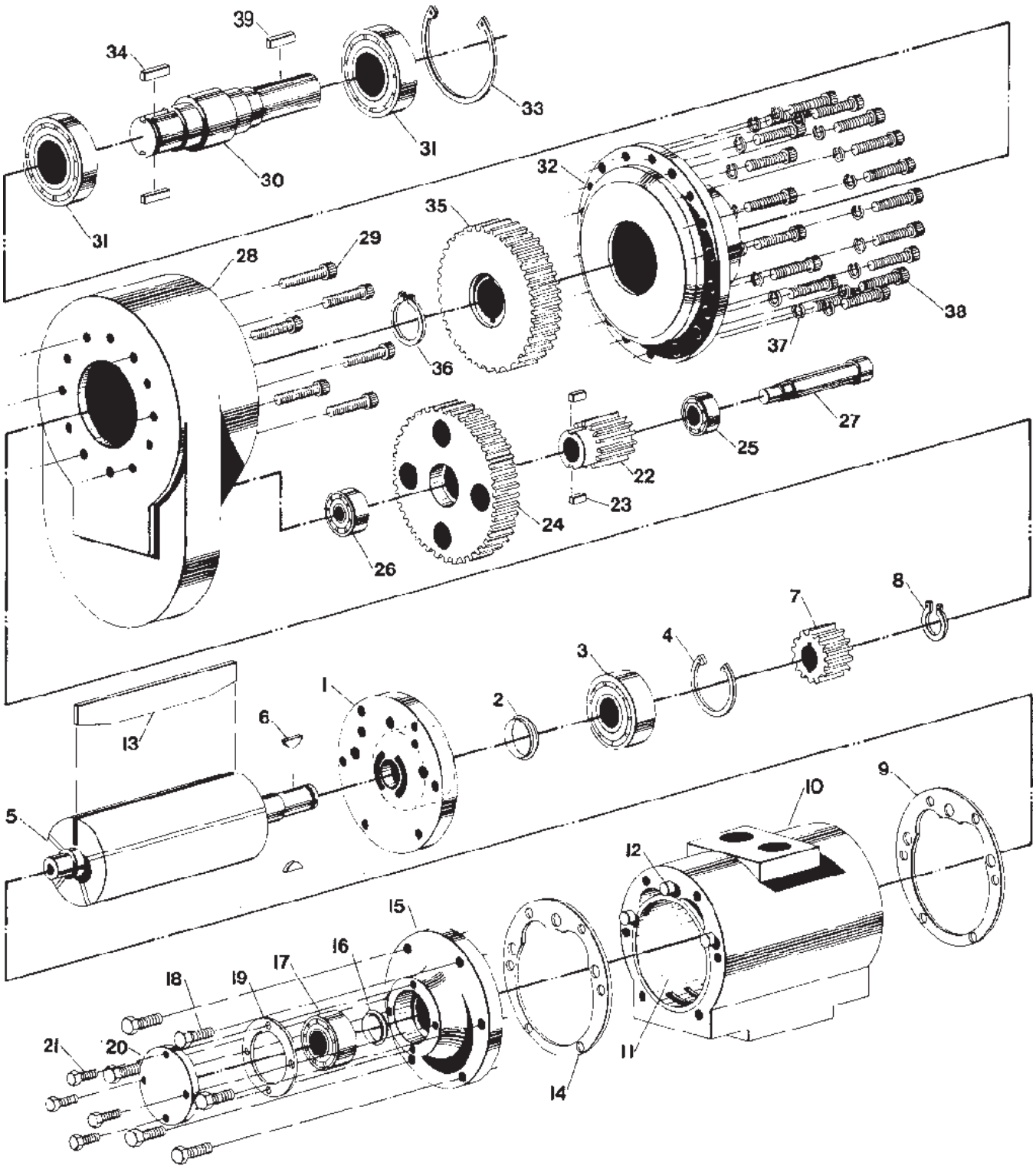


IMPORTANT: SET HYDRAULIC PRESSURE TO MAXIMUM OF 2100 PSI ON GAUGE #19. DO THIS BY ADJUSTING REGULATOR #15. DO NOT EXCEED THIS PRESSURE AS DAMAGE WILL RESULT.

550-PP Power Pack Assembly

Item	Part #	Part Name	Quantity Per Unit
3A	031-P03A	Filler Breather Cap	1
4A	031-P04A	Suction Strainer	1
5	031-P05	Gear Pump	1
5A	031-P05-1	Gear Pump Seal Kit	1
6	031-P06	1/2" Coupling Half (Gear Pump Side)	1
7	031-P07	7/8" Coupling Half (Air Motor Side)	1
8	031-P08	Insert	1
9	031-P09	Pump/ Motor Mount	1
10	031-P10	Check Valve	1
11	031-P11	Hydraulic Return Filter	1
11A	031-P11-1	Hydraulic Return Filter Element	1
12	002-F17	Air Filter	1
13	002-L17	Air Lubricator	1
14	031-P14	Ball Valve	1
15	031-P15	Air Regulator	1
16	031-P16	Air Motor	1
17	031-P17	Air Muffler	1
19	031-P19	Hydraulic Gage	1
22	031-P22	1 1/4" Ball Valve	1
23	031-VHC8-8F	1/2" Coupler (Female)	1
23A	031-VHN8-8F	1/2" Nipple (Male Not Shown)	1
24	031-VHN12-12F	3/4" Nipple (Male)	1
24A	031-VHC12-12F	3/4" Coupler (Female Not Shown)	1
25	031-10T40	1 1/4" Air Coupler (Male)	1
25A	031-10S41SL	1 1/4" Air Coupler (Female Not Shown)	1
26	031-P26	Accumulator	1

031-24660 Air Drive Assembly



031-24660 Air Drive Assembly

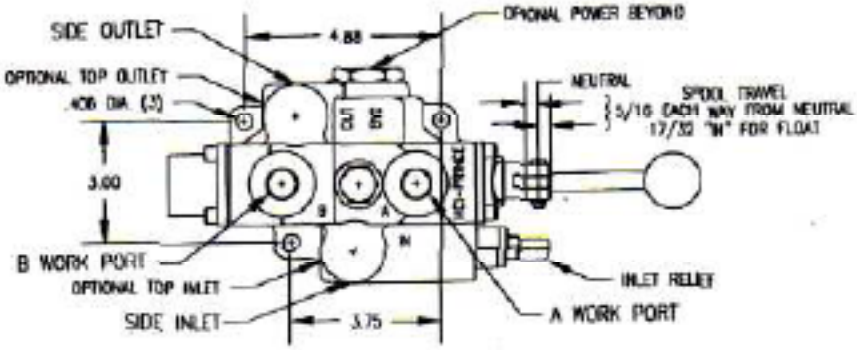
Item	Part #	Part Name	Quantity Per Unit
1	031-AR01	Inner Plate	1
2*	031-AR02	Pressure Seal	1
3*	031-AR03	Rotor Bearing	1
4	031-AR04	Lock Ring	1
5	031-AR05	Rotor	1
6	031-AR06	Pinion Gear Key	2
7	031-AR07	Pinion Gear	1
8	031-AR08	Lock Ring	1
9*	031-AR09	Inner Plate Gasket	1
10	031-AR10	Housing w/ Sleeve	1
12	031-AR12	Allignment Dowel	6
13*	031-AR13	Rotor Vane	5
14*	031-AR14	End Plate Gasket	1
15	031-AR15	End Plate	1
16*	031-AR16	Pressure Seal	1
17*	031-AR17	Rotor Bearing	1
18	031-AR18	End Plate Bolt	8
19*	031-AR19	Bearing Cap Gasket	1
20	031-AR20	Bearing Cap	1
21	031-AR21	Bearing Cap Bolt	4
22	031-AR22	Secondary Pinion	1
23	031-AR23	Key	2
24	031-AR24	Primary Gear	1
25	031-AR25	Bearing	1
26	031-AR26	Bearing	1
27	031-AR27	Shaft	1
28	031-AR28	Gear Housing	1
29	031-AR29	Bolt	6
30	031-AR30	Shaft	1
31	031-AR31	Sealed Bearing	2
32	031-AR32	Output Shaft	1
33	031-AR33	Retaining Ring	1
34	031-AR34	Key	2
35	031-AR35	Secondary Gear	1
36	031-AR36	Retaining Ring	1
37	031-AR37	Lock Washer	17
38	031-AR38	Bolt	17
39	031-M21	Key	1

NOTE

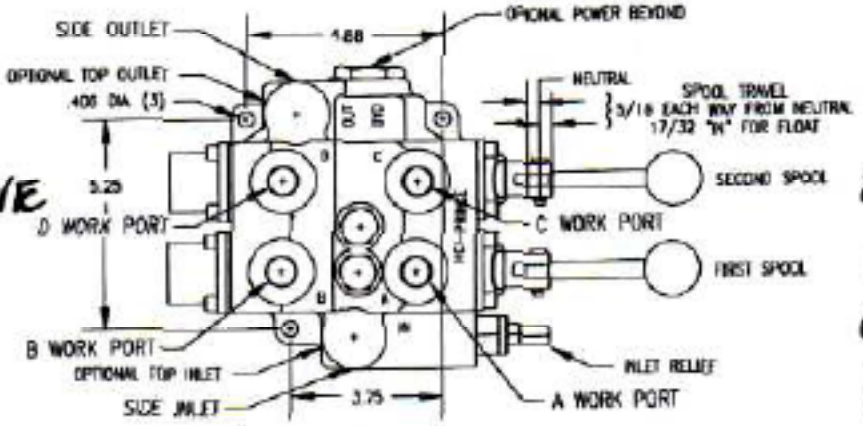
* These parts come only in a kit. Part # 031-AR-KIT includes these parts and quantities noted.

RD5000 PORT IDENTIFICATION

RD5100

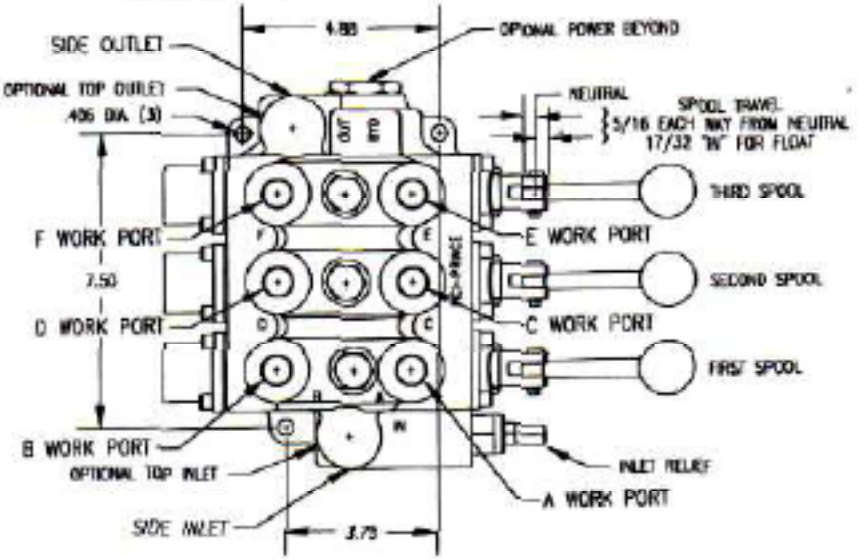


HAWK P/N
031-522VALVE



STARTED ON S/N 490+ (550 HYD)
ON 449+ (950 HYD)

RD5300

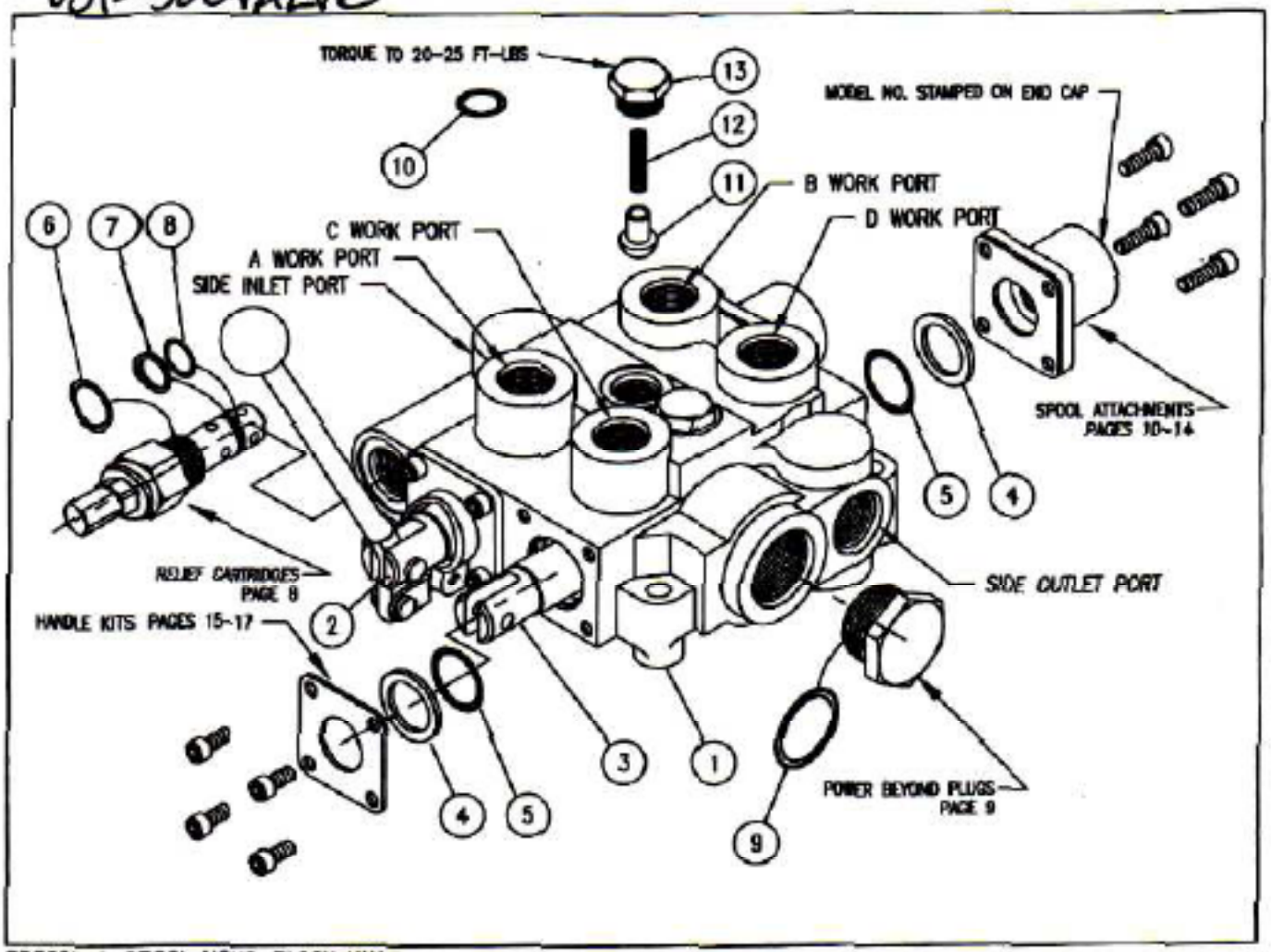


RD5000 SPECIFICATIONS

MAXIMUM OPERATING PRESSURE	3000 PSI
MAXIMUM TANK PRESSURE	500 PSI
MAXIMUM OPERATING TEMPERATURE	180°F
RECOMENDED SYSTEM FILTRATION	10 MICRON
FLOW RATING RD5100	30 GPM
RD5200 AND RD5300	25 GPM

RD5200 AND RD5300 ARE PARALLEL CIRCUIT VALVES.

031-522VALVE



RD5200 2 SPOOL MONO-BLOCK VALVE

2 SPOOL MONO-BLOCK VALVE

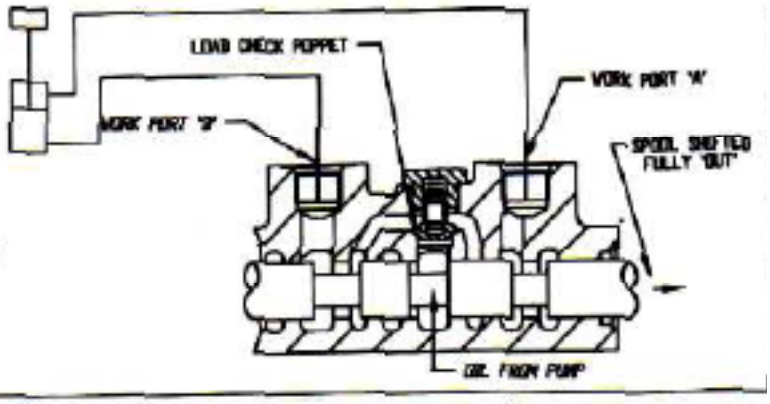
ITEM	QTY	PART NO.	DESCRIPTION
1	1		2 SPOOL VALVE BODY
2	1	SEE NOTE 1	FIRST SPOOL } These are matched parts and are not sold seperately.
3	1	SEE NOTE 1	SECOND SPOOL
4	4	670500010	SPOOL SEAL BACK-UP
5	4	240000213	213 O-RING
6	1	240000116	116 O-RING
7	1	240019015	015 BACK-UP } SEAL KIT 660552001 (PLUS OTHERS)
8	1	240000015	015 O-RING
9	1	240000916	916 O-RING
10	2	240000908	908 O-RING
11	2	670100001	LOAD CHECK POPPET } LOAD CHECK KIT, NO. 660150015
12	2	670300007	LOAD CHECK SPRING } (2 REQUIRED PER VALVE)
13	2	671600001	LOAD CHECK PLUG

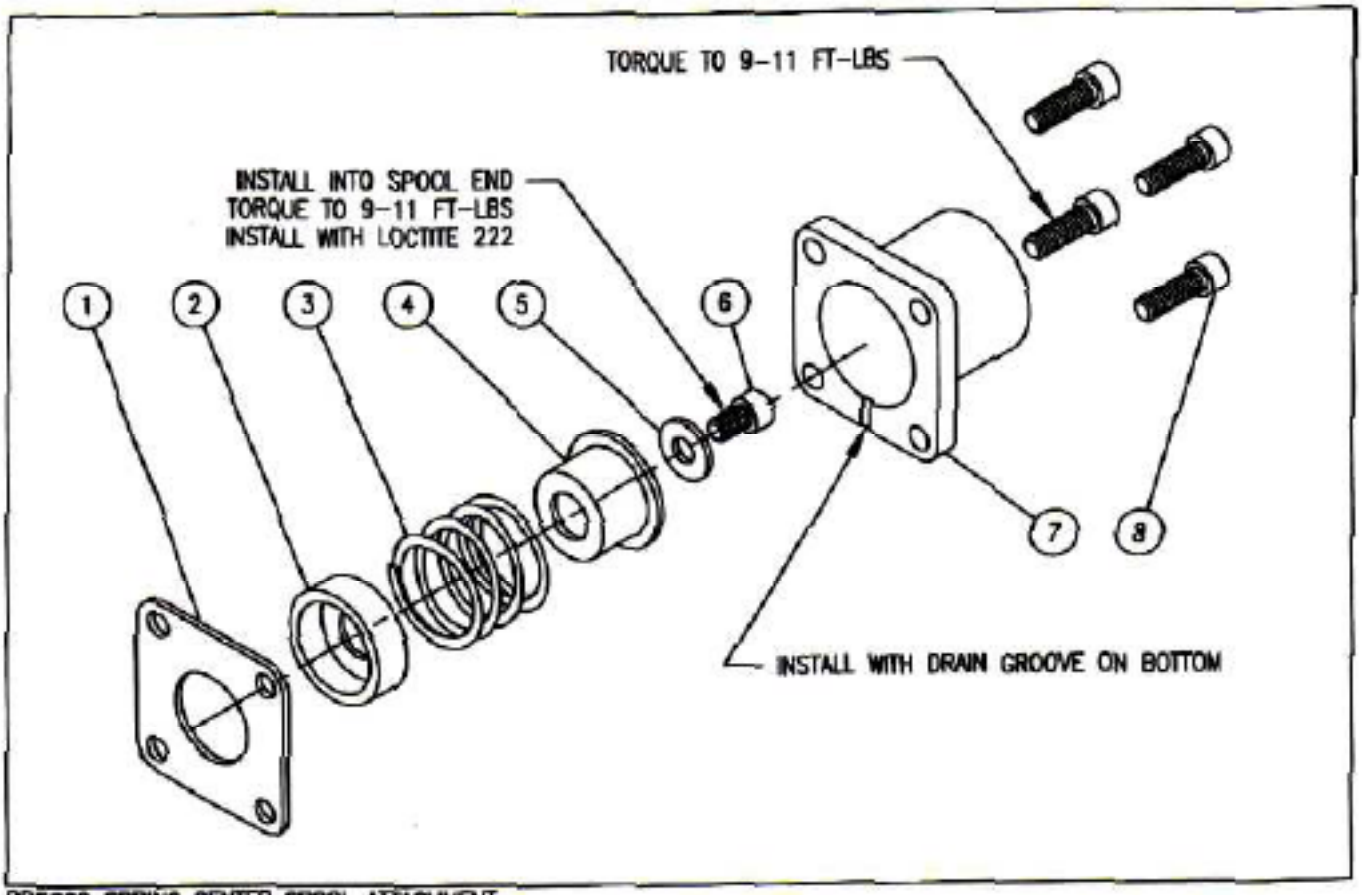
NOTES:
1. SEE SPOOL IDENTIFICATION CHART
2. VALVES WITH 3 WAY SPOOLS HAVE 'A' OR 'C' WORK PORT PLUGGED.

LOAD CHECK DESCRIPTION:

The load check feature is standard on all RD5000 series valves. Each spool has a seperate load check. The load check will prevent the fall of a cylinder as the spool is shifted. It also prevents the backflow of oil from the work port to the inlet. As shown to the right, the pump must build up enough pressure to overcome the pressure on the work port caused by the weight of the load before the cylinder can move.

PLEASE NOTE that the load check has nothing to do with how well the valve will hold up a cylinder with the spool in neutral. The load check is functional only when the spool is shifted.



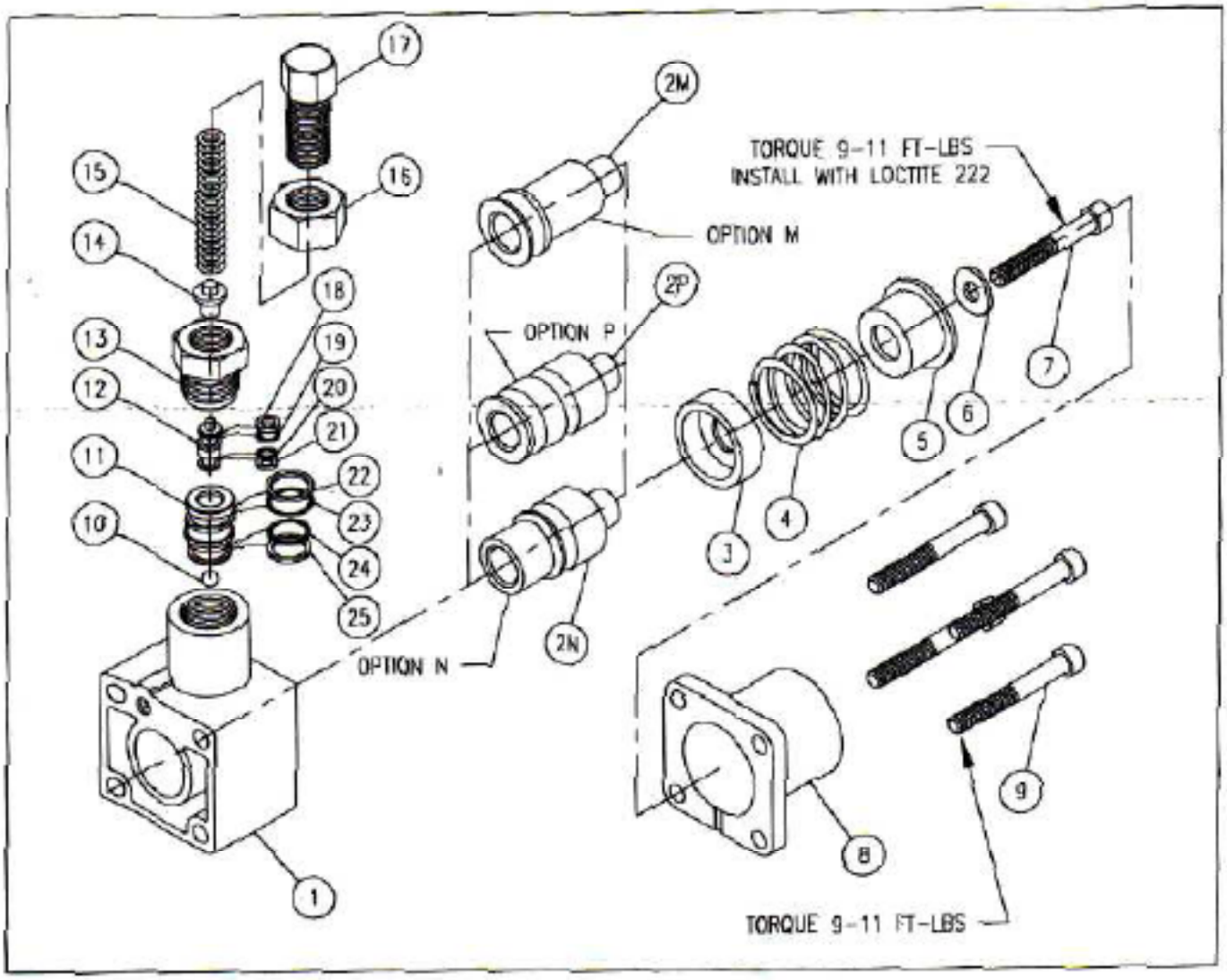


RD5000 SPRING CENTER SPOOL ATTACHMENT

RD5000 SPRING CENTER SPOOL ATTACHMENT (OPTION A)

ITEM	QTY	PART NO.	DESCRIPTION	
1	1	670500003	RETAINER PLATE	SPRING CENTER KIT NO. 660150001
2	1	671400001	STOP CUP (INNER)	
3	1	670300001	CENTERING SPRING*	
4	1	671400011	STOP CUP (OUTER)	
5	1	670500004	WASHER	
6	1	170003007	SOCKET HD. CAP SCREW	
7	1	670500005	END CAP	
8	4	170003008	SOCKET HD. CAP SCREW	

*STANDARD CENTERING SPRING CAN BE REPLACED WITH MEDIUM HEAVY SPRING PART NO. 670300047 OR HEAVY SPRING 670300043.



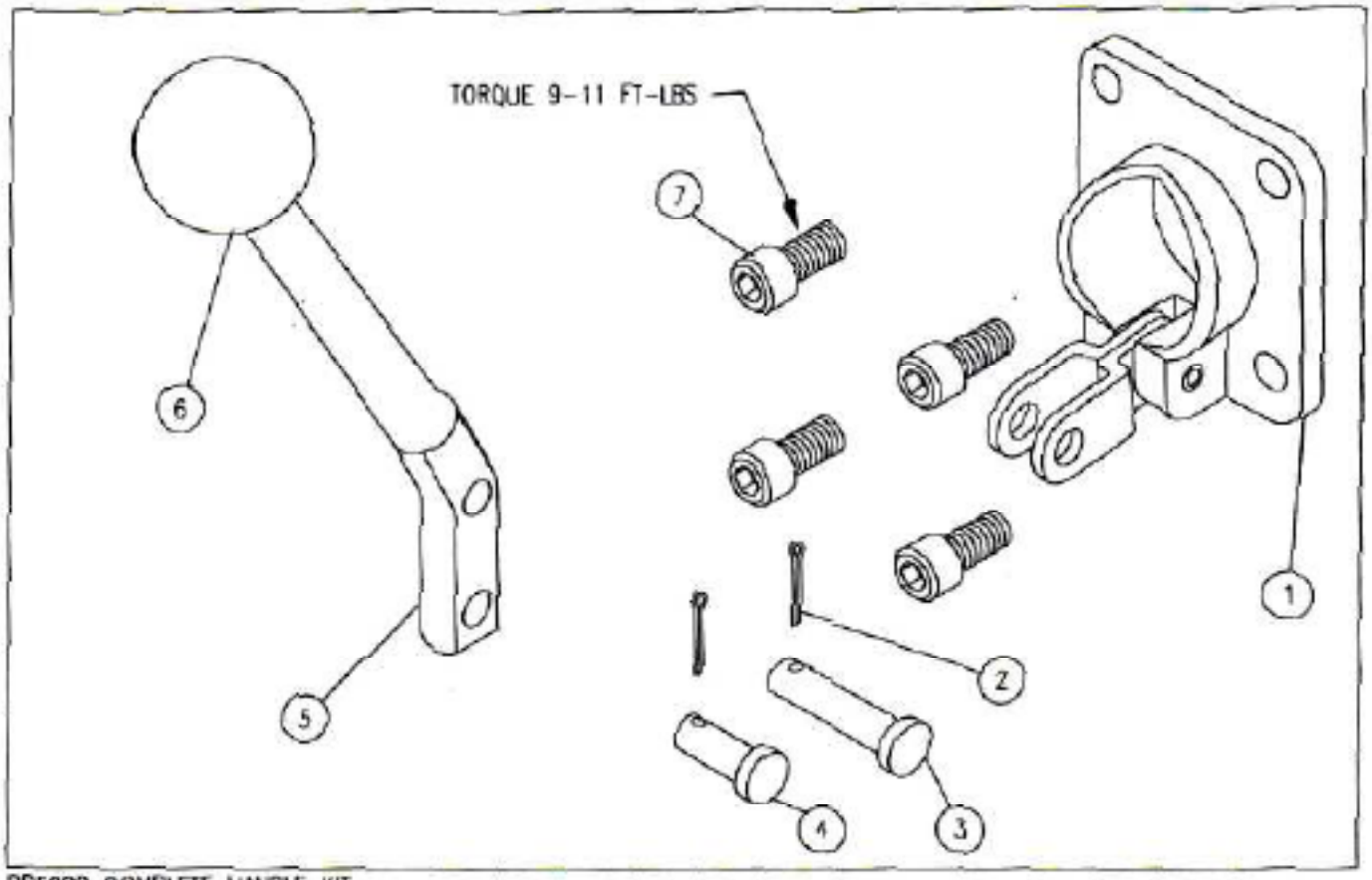
SPRING CENTER DETENT IN (OPTION M), DETENT OUT (OPTION N), AND IN AND OUT (OPTION P)

ITEM	QTY	PART NO.	DESCRIPTION
1	1	624890001	DETENT BODY
2P	1	670700005	SPOOL SLEEVE (OPTION P)
2N	1	670700004	SPOOL SLEEVE (OPTION N)
2M	1	670700027	SPOOL SLEEVE (OPTION M)
3	1	671400001	STOP CUP (INNER)
4	1	670300001	SPRING
5	1	671400011	STOP CUP (OUTER)
6	1	670500004	WASHER
7	1	170003019	CAP SCREW
8	1	670500005	END CAP
9	4	170003019	CAP SCREW
10	1	230009009	STEEL BALL
11	1	671100012	PISTON SLEEVE
12	1	671100011	PISTON
13	1	671600052*	RETAINER PLUG
14	1	671100016*	SPRING ADAPTER
15	1	670300033*	SPRING
16	1	671800013*	JAM NUT
17	1	671900016*	ADJ. SCREW
18	1	240019008	008 BACK-UP WASHER
19	1	240016068	O-RING
20	1	240016067	O-RING
21	1	240019007	007 BACK-UP WASHER
22	1	240019014	014 BACK-UP WASHER
23	1	240000014	014 O-RING
24	1	240000013	013 O-RING
25	1	240019013	013 BACK-UP WASHER

*ADJUSTING CARTRIDGE NO. 660330002

OPTION M KIT NO. 660150023
OPTION N KIT NO. 660150018
OPTION P KIT NO. 660150020

NOTE:
1. TO ADJUST MANUAL DETENT HOLDING FORCE LOOSEN JAM NUT ITEM 16 AND TURN ADJUSTING SCREW ITEM 17 CLOCKWISE TO INCREASE HOLDING FORCE AND COUNTERCLOCKWISE TO DECREASE HOLDING FORCE. HANDLE FORCE TO MOVE SPOOL OUT OF DETENT SHOULD BE APPROXIMATELY 4-5 LBS.
2. APPLY LIGHT COAT OF GREASE TO ITEMS 18-25 DURING ASSEMBLY.

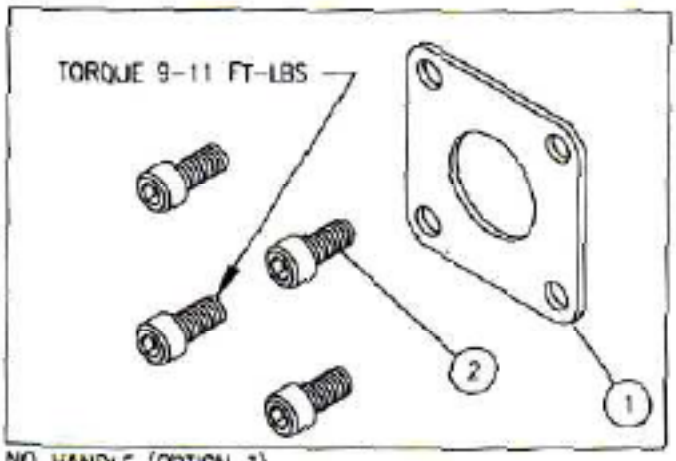


RD5000 COMPLETE HANDLE KIT

RD5000 COMPLETE HANDLE KIT (OPTION 1)

ITEM	QTY	PART NO.	DESCRIPTION		
1	1	660350001	CLEVIS SUB-ASSY		COMPLETE HANDLE KIT, NO. 660150039
2	2	220001512	COTTER PIN	HANDLE KIT NO. 660150004	
3	1	671700002	CLEVIS PIN		
4	1	671700001	CLEVIS PIN		
5	1	670400001	HANDLE		
6	1	670400002	KNOB		
7	4	170003017	CAP SCREW		

HANDLE OPTION 2, LESS HANDLE ONLY, CONTAINS ABOVE PARTS LESS ITEMS 5 & 6. PIN KIT NO. 660150022

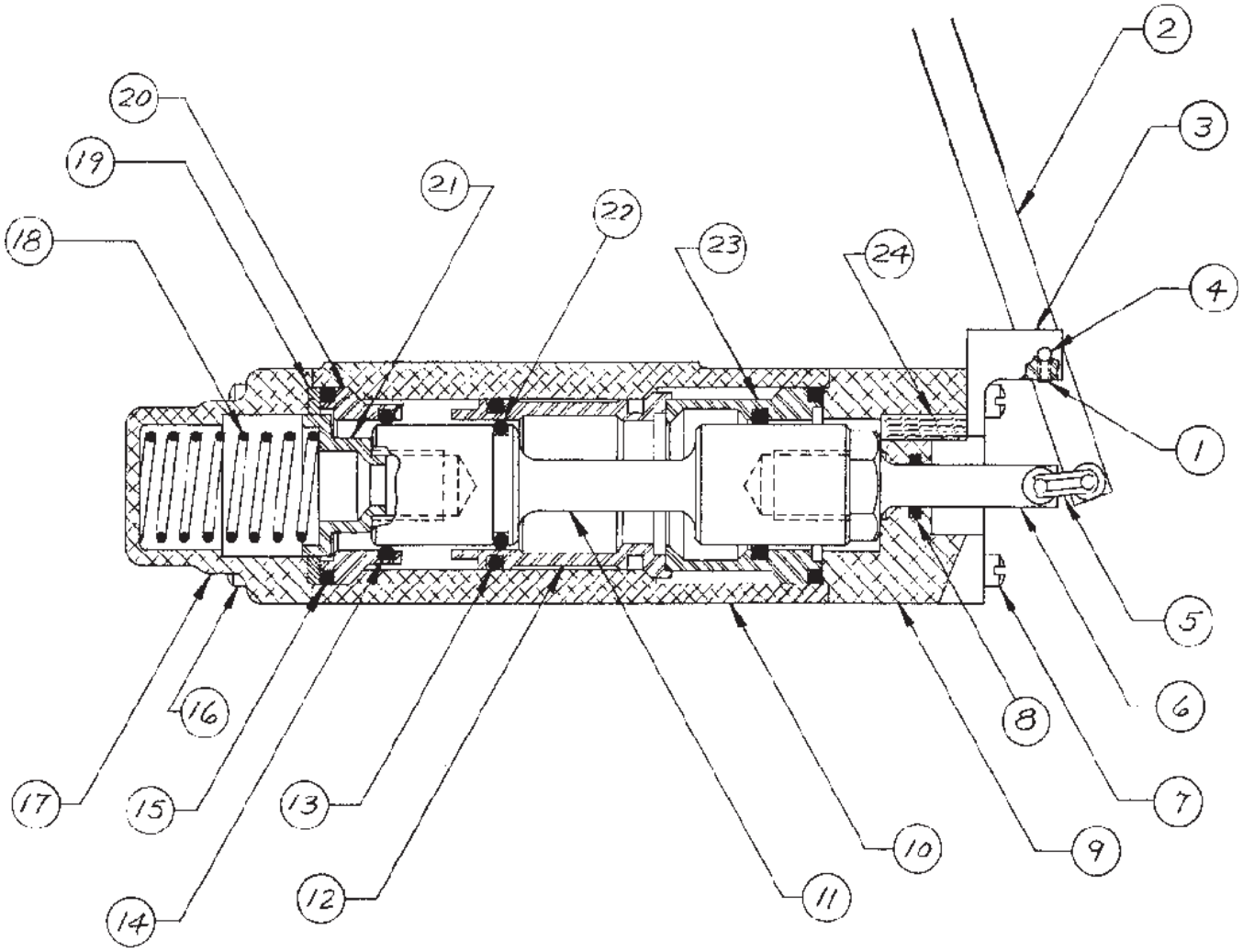


NO HANDLE (OPTION 3)

NO HANDLE (OPTION 3)

ITEM	QTY	PART NO.	DESCRIPTION
1	1	670500003	RETAINER PLATE
2	4	170003017	CAP SCREW

002-13170 Throttle Valve Assembly

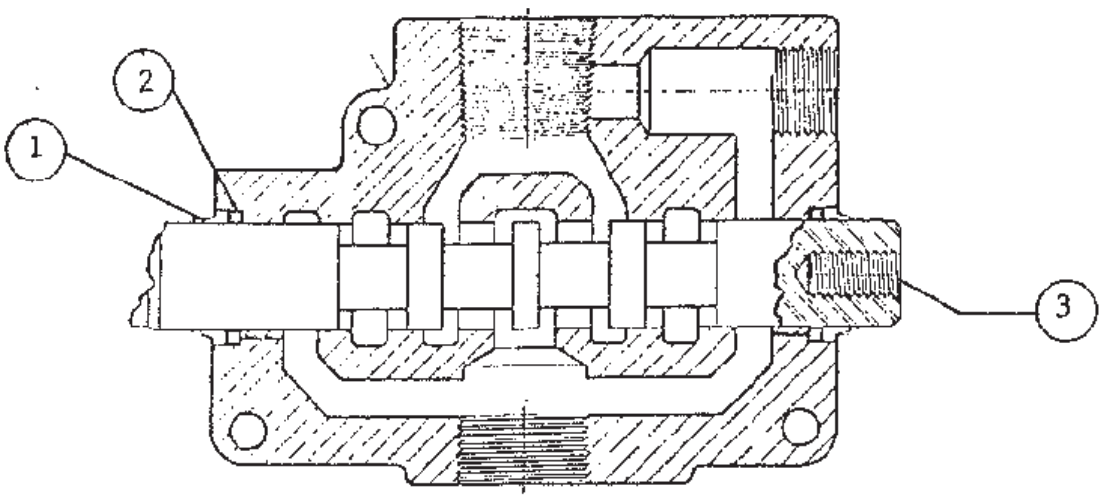


(25) REPAIR KIT
CONSISTS OF ITEMS NO.: 8, 13, 14, 15, & 22

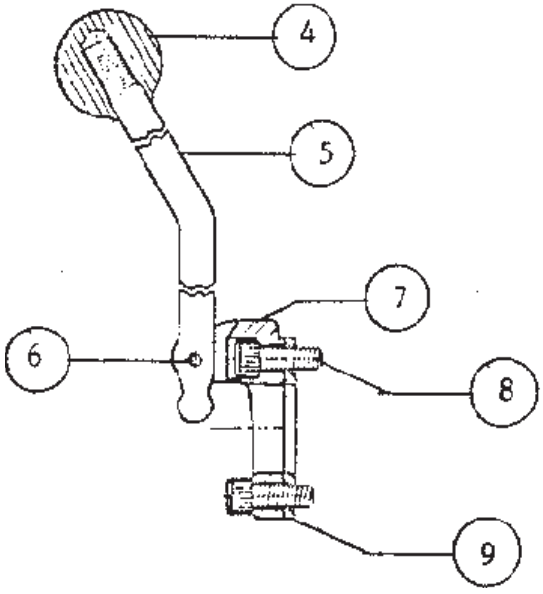
002-13170 Throttle Valve Assembly

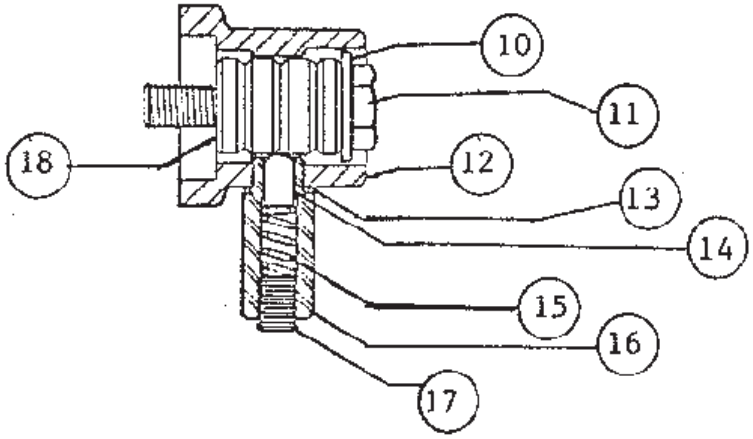
Item	Part #	Part Name	Quantity Per Unit
1	031-TV-01	Set Screw	1
2	031-TV-02	Handle Assy.	1
3	031-TV-03	Bracket	1
4	031-TV-04	Pin	1
5	031-TV-05	Link Assy.	1
6	031-TV-06	Rod	1
7	031-TV-07	Screw	4
8*	See item 25	"O" Ring	1
9	031-TV-09	Lever Cap	1
10	031-TV-10	Body	1
11	031-TV-11	Plunger	1
12	002-13170-3	Bushing	1
13*	See item 25	"O" Ring	1
14*	See item 25	"O" Ring	2
15*	See item 25	"O" Ring	2
16	031-TV-16	Screw	4
17	031-TV-17	Spring Cap	1
18	031-TV-18	Spring	1
19	031-TV-19	Washer	1
20	031-TV-20	Bearing	1
21	031-TV-21	Spring Cup	1
22*	See item 25	"O" Ring	1
23	031-TV-23	Retainer	1
24	031-TV-24	Filter	1
25	002-V-2701-RK	Seal Kit	1

031-25VALVE-A Valve Assy. (Air)



NOTE: SEAL KIT PN: 031-*24-A-RK





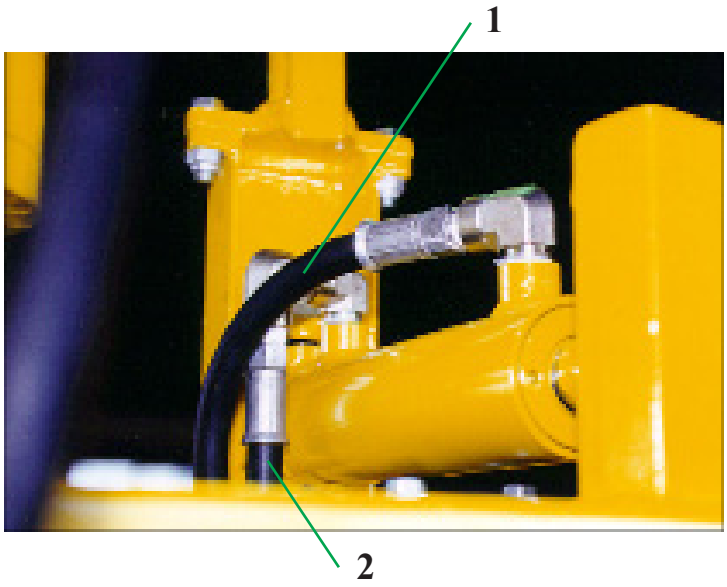
031-25VALVE-A Valve Assy. (Air)

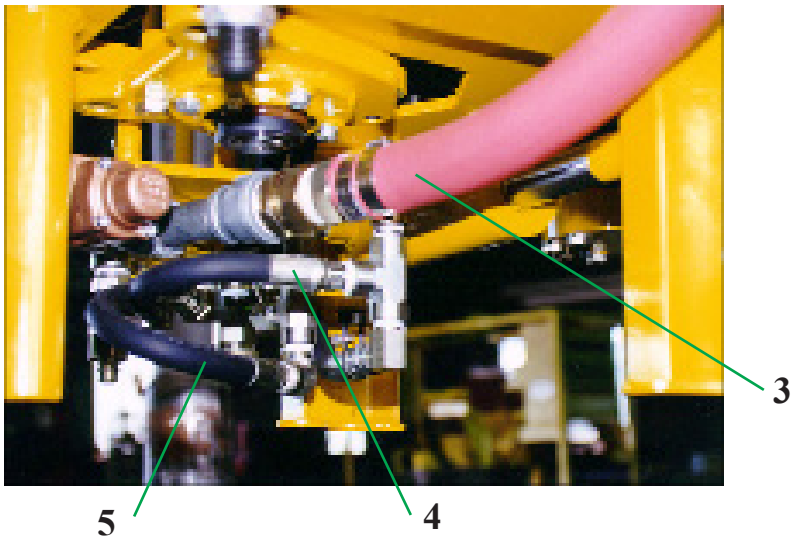
Item	Part #	Part Name	Qty.Per Unit
*1	031-B01	Wiper	2
*2	031-B02	Quad Ring	2
3	031-B03	Closed Center Spool	1
4	031-B04	Ball Knob	1
5	031-B05	Handle	1
6	031-B06	Roll Pin	1
7	031-B07	Clevis Bracket	1
8	031-B08	Cap Screw 1/4"-20 x 3/4"	2
9	031-B09	Seal Retainer	1
10	031-B10	Steel Washer	1
11	031-B11	Cap Screw 5/16"-18 x 1 1/2"	1
12	031-B12	End Cap (3 position Detent)	1
13	031-B13	Washer	1
14	031-B14	Detent Plunger	1
15	031-B15	Spring	1
16	031-B16	Detent Housing	1
17	031-B17	Set Screw 5/16"-24 x 3/8"	1
18	031-B18	Detent Sleeve	1

NOTE

* These parts come only in a kit. Part # 031-24-A-RK includes these parts and quantities noted.

550 & 950Air Spinmaster Hose

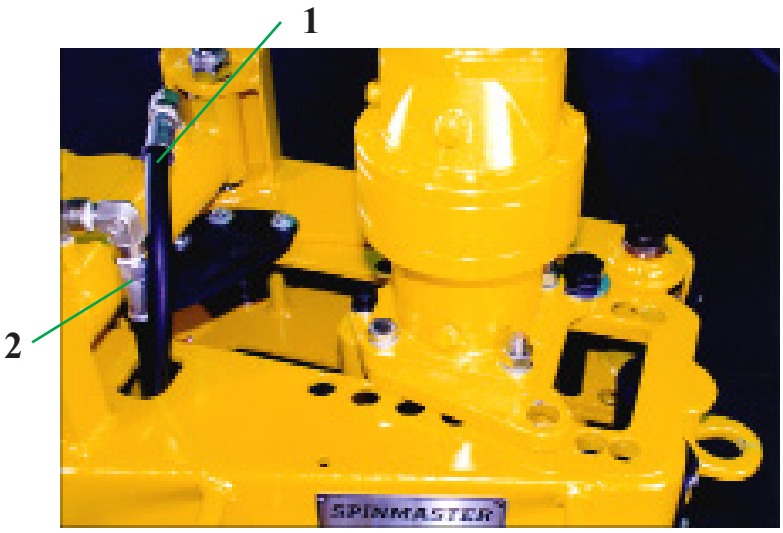


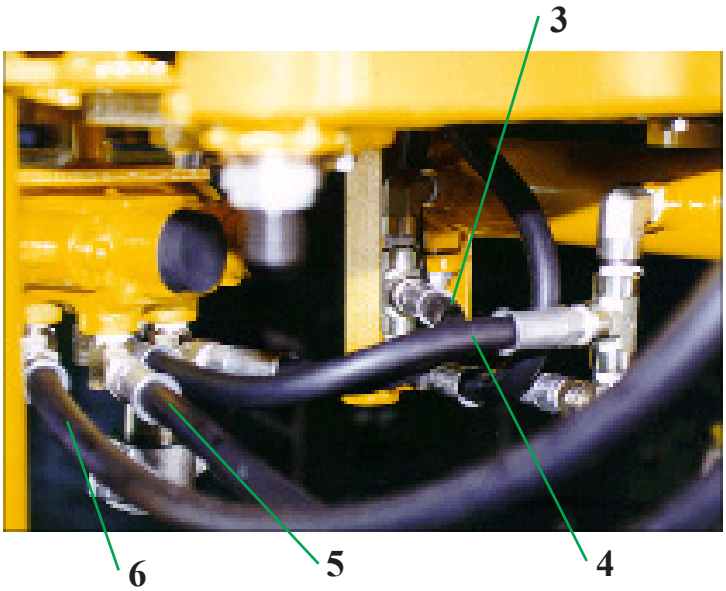


550 Air Spinmaster			
Item	**Part #**	**Part Name**	**Qty.Per Unit**
1	031-24738-8	Hydraulic Hose (top rod to bottom rod)	1
2	031-24738-8	Hydraulic Hose (top piston to bottom piston)	1
3	031-1-1/4x42"	Air Hose (air valve to air motor)	1
4	031-24738-5	Hydraulic Hose (bottom rod to valve)	1
5	031-24738-6	Hydraulic Hose (bottom piston to valve)	1

950 Air Spinmaster			
Item	**Part #**	**Part Name**	**Qty.Per Unit**
1	031-24738-8	Hydraulic Hose (top rod to bottom rod)	1
2	031-24738-13	Hydraulic Hose (top piston to bottom piston)	1
3	031-1-1/4x50"	Air Hose (air valve to air motor)	1
4	031-24738-5	Hydraulic Hose (bottom rod to valve)	1
5	031-24738-6	Hydraulic Hose (bottom piston to valve)	1

550 & 950 HydraulicSpinmaster Hose

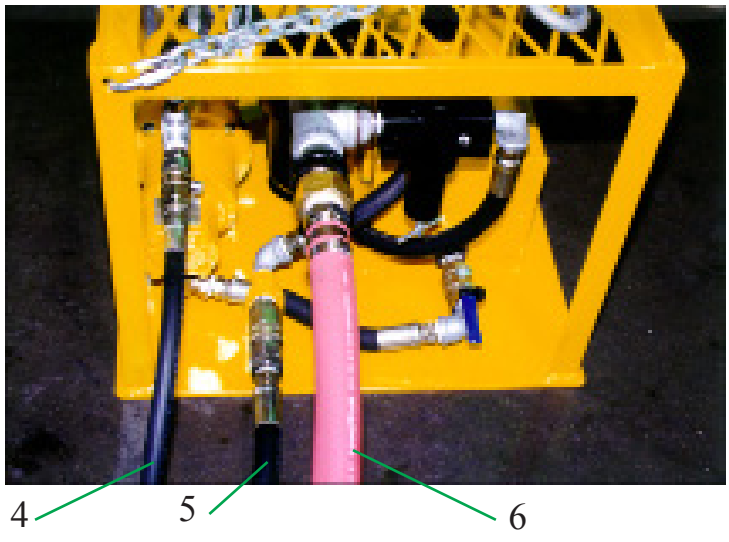




550 Hydraulic Spinmaster Hoses			
Item	**Part #**	**Part Name**	**Qty.Per Unit**
1	031-24738-4	Hydraulic Hose (top rod to bottom rod)	1
2	031-24738-3	Hydraulic Hose (top piston to bottom piston)	1
3	031-24738-1	Hydraulic Hose (bottom piston to valve)	1
4	031-24738-2	Hydraulic Hose (bottom rod to valve)	1
5	031-24737	Hydraulic Hose (valve to motor)	1
6	031-24737	Hydraulic Hose (valve to motor)	1

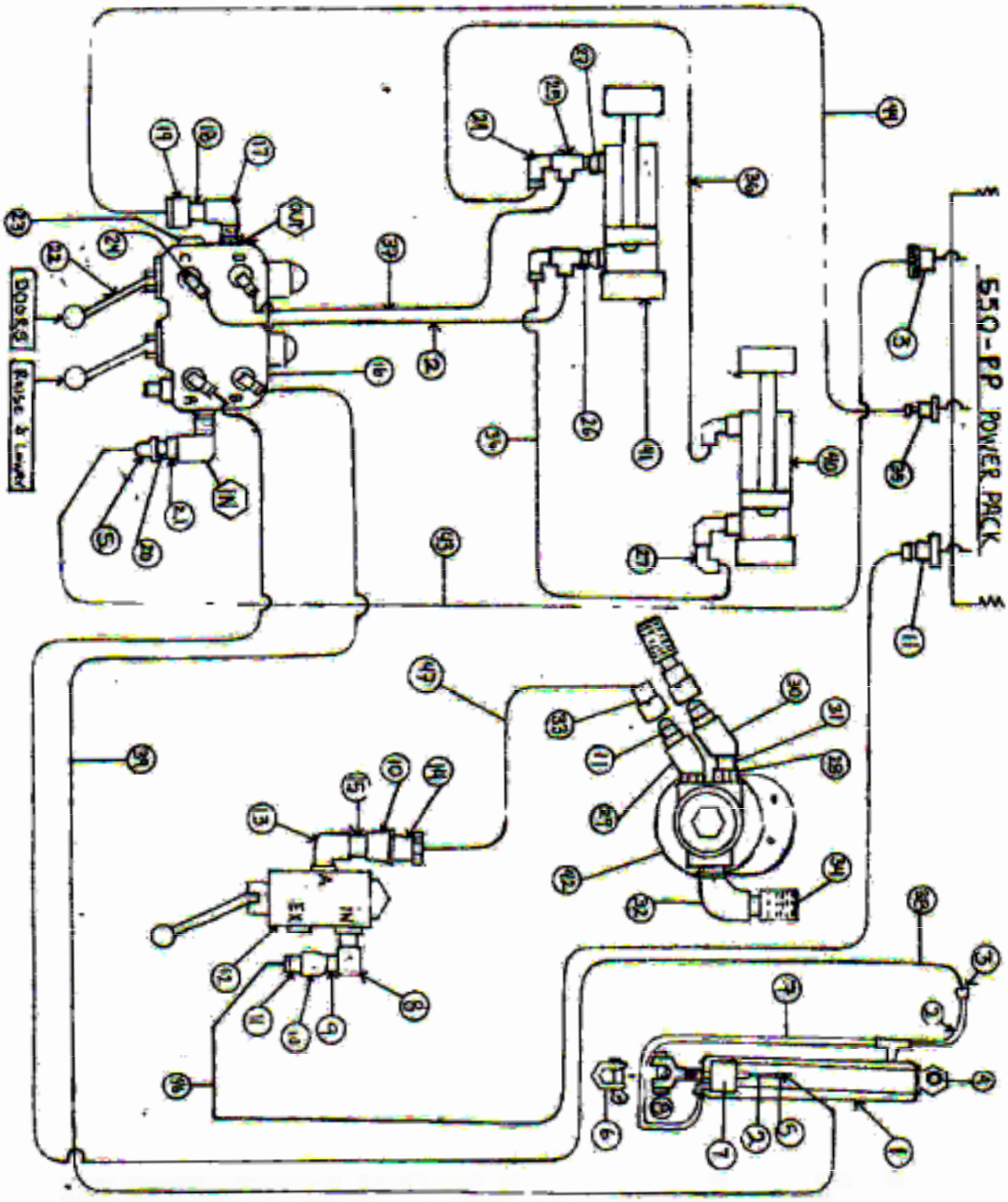
950 Hydraulic Spinmaster Hoses			
Item	**Part #**	**Part Name**	**Qty.Per Unit**
1	031-24738-8	Hydraulic Hose (top rod to bottom rod)	1
2	031-24738-13	Hydraulic Hose (top piston to bottom piston)	1
3	031-24738-5	Hydraulic Hose (bottom piston to valve)	1
4	031-24738-6	Hydraulic Hose (bottom rod to valve)	1
5	031-24738-14	Hydraulic Hose (valve to motor)	1
6	031-24738-14	Hydraulic Hose (valve to motor)	1

550-PP Power Pack Hose



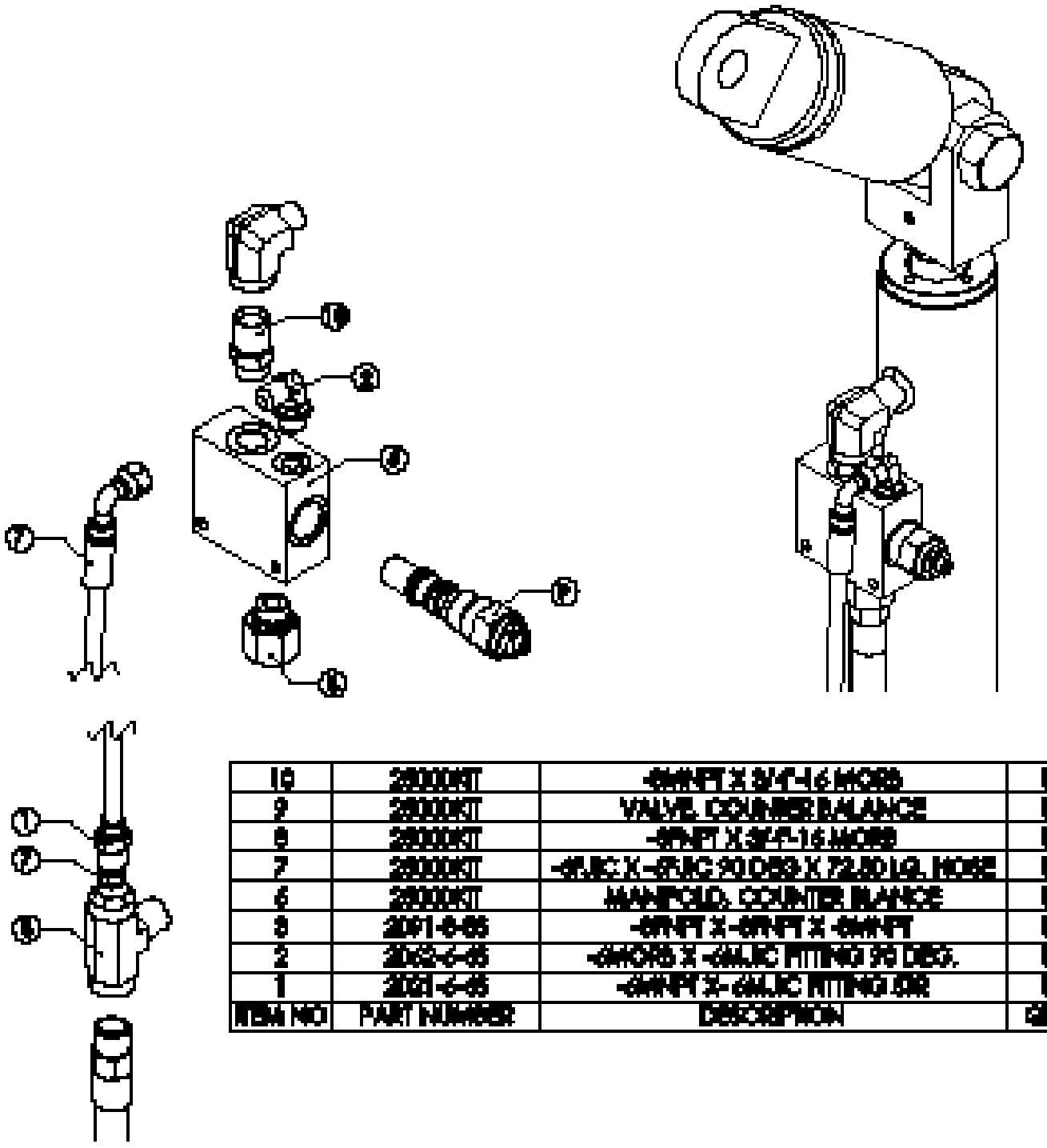
550-PP Power Pack Hose

Item	Part #	Part Name	Qty.Per Unit
1	031-24738-10	Hydraulic Hose (from return Q.D. to return filter)	1
2	031-24738-11	Hydraulic Hose (from air regulator to air motor)	1
3	031-24738-12	Hydraulic Hose (from tank to hydraulic pump suction)	1
4	031-550-PP-H-1	Hydraulic Hose (from power pack supply to Spinmaster)	1
5	031-550-PP-H-2	Hydraulic Hose (from power pack return to Spinmaster)	1
6	031-550-PP-H-3	Air Hose (from power pack supply to Spinmaster)	1



ITEM	PART NUMBER	DESCRIPTION	QTY
1	031-214184	LIFT CYLINDER 3X48"	1
2	031-24738-5	1/2"MNPTX1.5"HYD HOSE	3
3	031-VHC8-8F	1/2" COUPLER	3
4	999-806594-500	1"-14 FLEX LOCK NUT	2
5	031-VHN8-8F	1/2" N PPLE	3
6	031-G2130-5/8"	5/8"SHACKLE	2
7	061-25000	COUNTER BAL VLV KIT	1
8	999-5140-1	1" 9000SS SWIVEL	1
9	999-805486	1"X CLOSE NIPPLE	1
10	999-806686	1-1/4"X1"HPX REDUCER	2
11	002-3JIT40	1-1/4" MNPT PLUG	3
12	002-31170	THROTTLE MOTOR VALVE	1
13	999-801900	1" ST ELBOW 9000SS	1
14	999-2065-20205	1-1/4"HP HOSE SWIVEL	1
15	998-805546	1" X 3" NIPPLE	1
16	031-5V2VALVE	HYDRAULIC VALVE	1
17	999-2252-12125	3/4" HP SWIVEL 9000EG	2
18	999-805313	3/4" CLOSE NIPPLE LP	1
19	031-VHC12-12F	3/4" COUPLER	2
20	999-2083-6-65	3/8" HP HEX NIPPLE	1
21	999-2081-12-85	3/4" X 1/2" HP HX BUSHING	1
22	031-660150004	HANDLE KIT	2
23	031-25804	CLOSED CENTER PLUG	1
24	999-2047-8-85	1/2"HP 9000EG ST ELB SWVL	6
25	999-2090-8-85	1/2" HP TEE	2
26	999-805310	1/2" CLOSE NIPPLE HP	2
27	999-2089-8-85	1/2" 9000EG ST ELB	5
28	999-2040-16205	1"TO1-1/4"PIPE ADAPTOR	2
29	999-801923	1-1/4" ST ELB 450EG	1
30	999-801825	1-1/4" ELBOW 450EG	1
31	999-805593	1-1/4"X3" NIPPLE	1
32	999-801922	1-1/4" ST ELB 9000EG	3
33	002-3054151	1-1/4"NPT SOCKET	4
34	031-VHN12-12F	3/4" NIPPLE	2
35	031-VHN12-8F	1-1/4"MUFFLER	2
36	031-24738-8	1/2"MNPTX31" HYD HOSE	2
37	031-24738-5	1/2"MNPTX13.5"HYD HOSE	3
38	031-25802	1/2"MNPTX62"HYD HOSE	1
39	031-25801	1/2"MNPTX100"HYD HOSE	1
40	031-24CY125-AS	TOP CYLINDER	1
41	031-24CY125-BS	BOTTOM CYLINDER	1
42	031-24660	AIR DRIVE ASSY	1
43	031-550-PP-H-1	1/2"SUPPLY HOSE 20FT	1
44	031-550-PP-H-2	3/4"RETURN HOSE 20FT	1
45	031-550-PP-H-3	1-1/4" AIR SPLY HOSE 20FT	1
46	002-1-1/4X90°	AIR HOSE TO AIR MOTOR	1

25000 Counterbalance Kit



ITEM NO	PART NUMBER	DESCRIPTION	QTY
10	25000KT	-6MNPT X 3/4-16 MORB	1
9	25000KT	VALVE, COUNTER BALANCE	1
8	25000KT	-6FNPT X 3/4-16 MORB	1
7	25000KT	-6JIC X -6JIC 20.00 X 72.00 LG. HOSE	1
6	25000KT	MANIFOLD, COUNTER BALANCE	1
5	2091-6-6S	-6FNPT X -6FNPT X -6MNPT	1
2	2062-6-6S	-6MORB X -6MJIC FITTING 90 DEG.	1
1	2021-6-6S	-6MNPT X -6MJIC FITTING STR.	1

25800 Lift Cylinder Kit

031-25801 100" Hose Assy

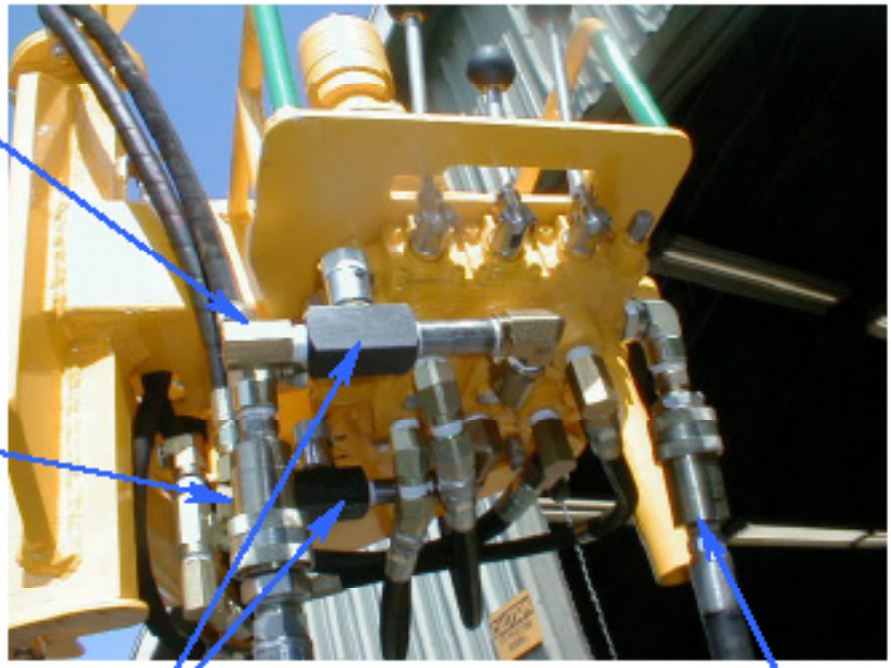
031-214184 Lift Cylinder

031-25802 52" Hose Assy

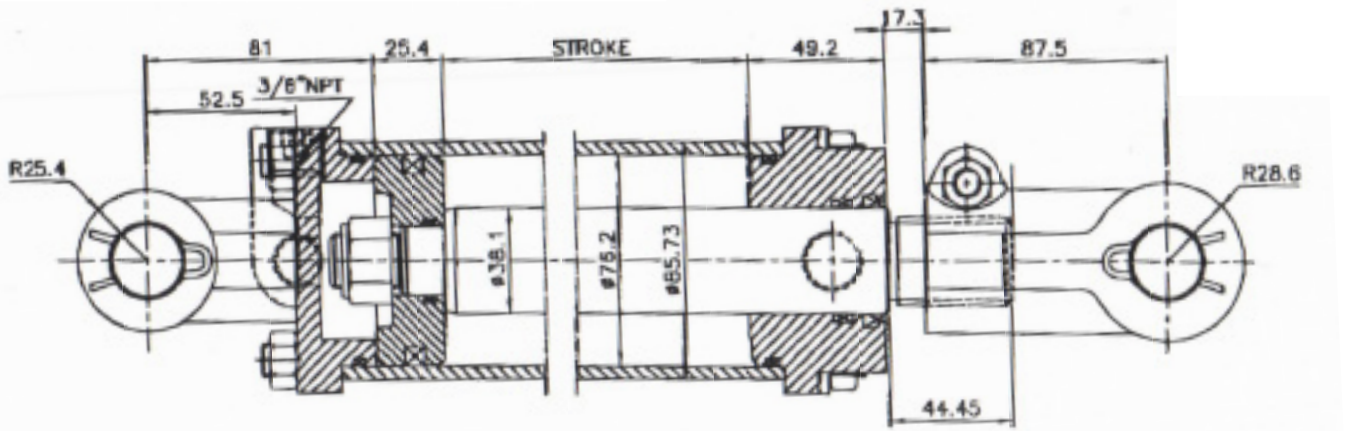
031-VHC8 8F COUPLER
(RETURN LINE)

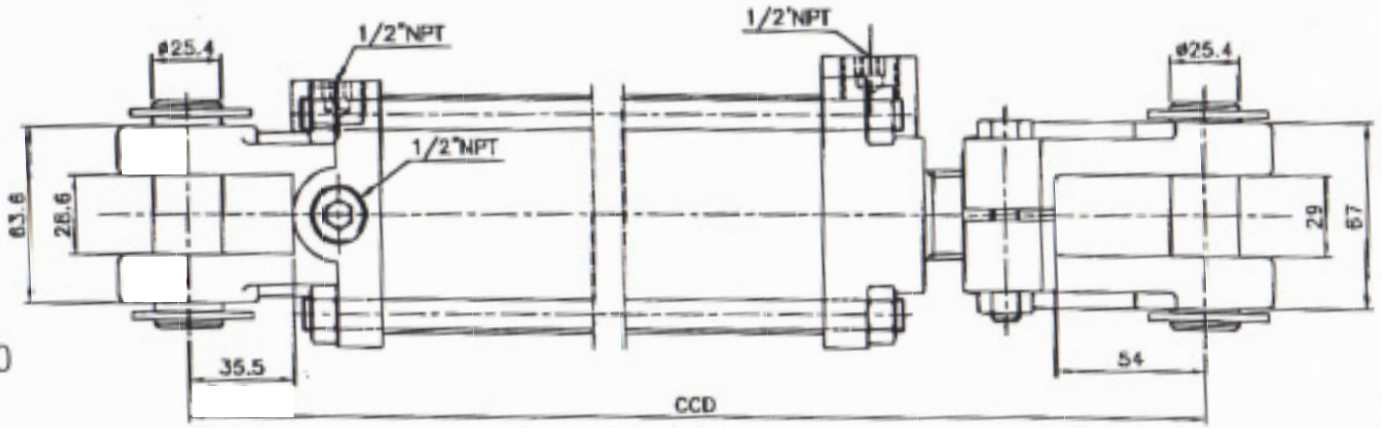
031-VHN8 8F NIPPLE
(SUPPLY LINE)

25800 Lift Cylinder Kit



MODEL	STROKE mm	Center To Center Distance (CCD) mm
3048 TC	1219.2	1479.6





HAWK PART NO:
031-214184
LIFT CYLINDER

SEAL KIT:
Part No.: 031-TCSK-3150

SPECIFICATION

BORE : 3" (76.2 mm)

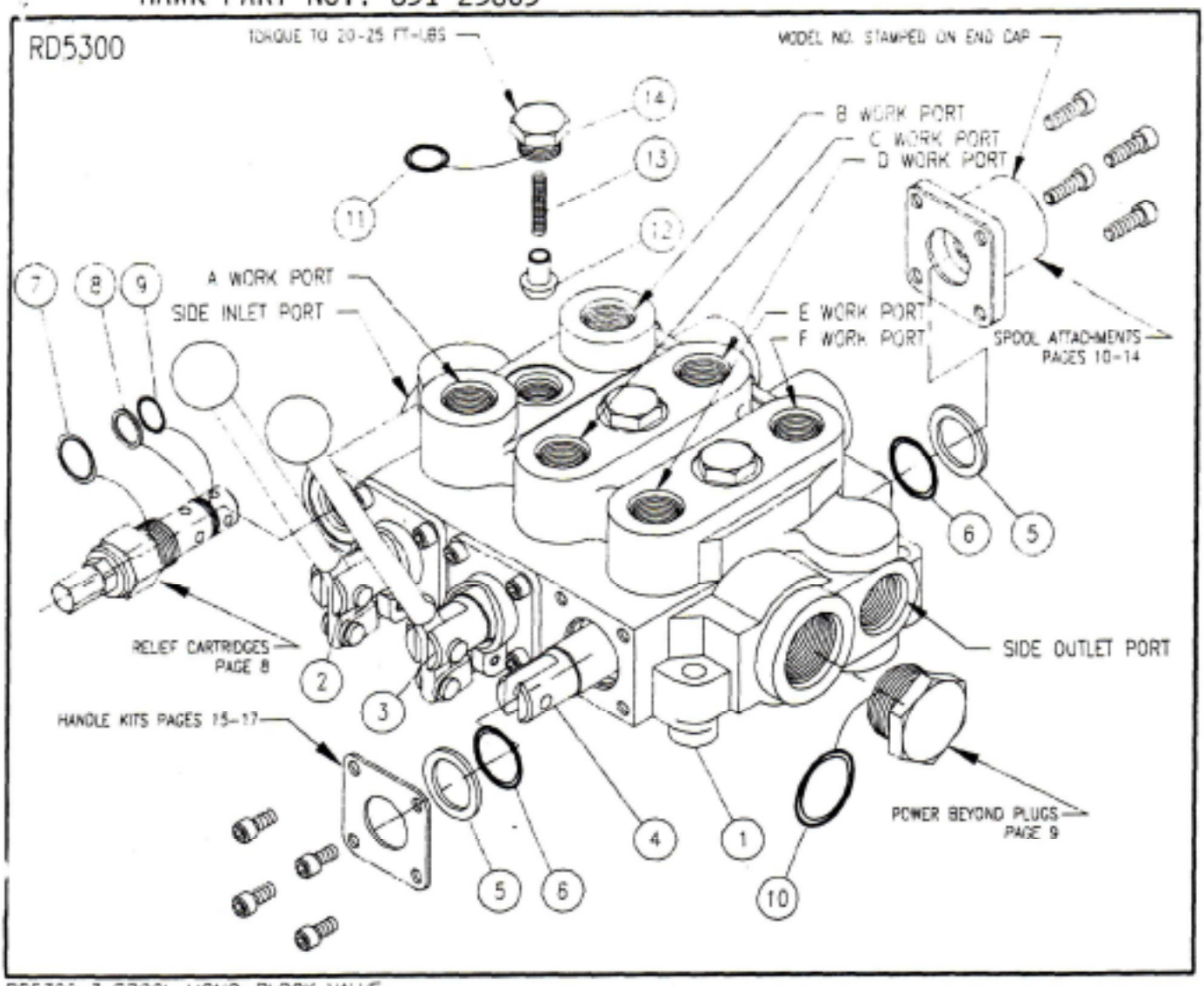
ROD : 1.5" (38.1mm)

WORKING PRESSURE :2500PSI(175 BAR)

TESTING PRESSURE : 3000PSI(210 BAR)

TYPE : DOUBLE ACTING, TIEROD CONSTRUCTION

HAWK PART NO.: 031-25803

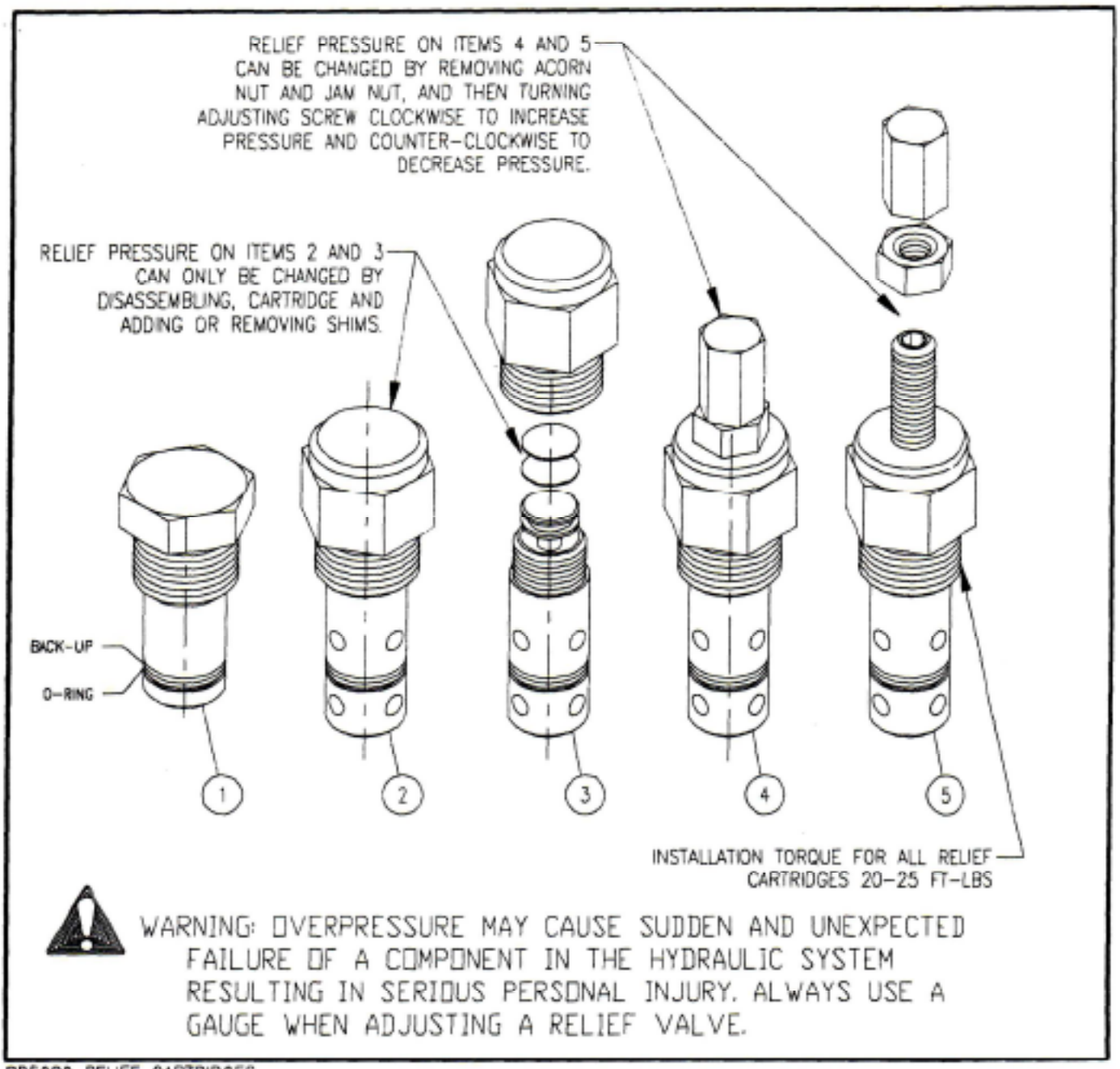


RD5300 3 SPOOL MONO-BLOCK VALVE

RD5300 3 SPOOL MONO-BLOCK VALVE

ITEM	QTY	PART NO.	DESCRIPTION
1	1		3 SPOOL VALVE BODY
2	1	SEE NOTE 1	FIRST SPOOL } These are matched parts and are not sold seperately.
3	1	SEE NOTE 1	SECOND SPOOL
4	1	SEE NOTE 1	THIRD SPOOL
5	6	670500010	SPOOL SEAL BACK-UP
6	6	240000213	213 O-RING
7	1	240000116	116 O-RING
8	1	240019015	015 BACK-UP } SEAL KIT 660553001 (PLUS OTHERS)
9	1	240000015	015 O-RING
10	1	240000916	916 O-RING
11	3	240000908	908 O-RING
12	3	670100001	LOAD CHECK POPPET } LOAD CHECK KIT, NO. 660150015
13	3	670300007	LOAD CHECK SPRING } (3 REQUIRED PER VALVE)
14	3	671600001	LOAD CHECK PLUG

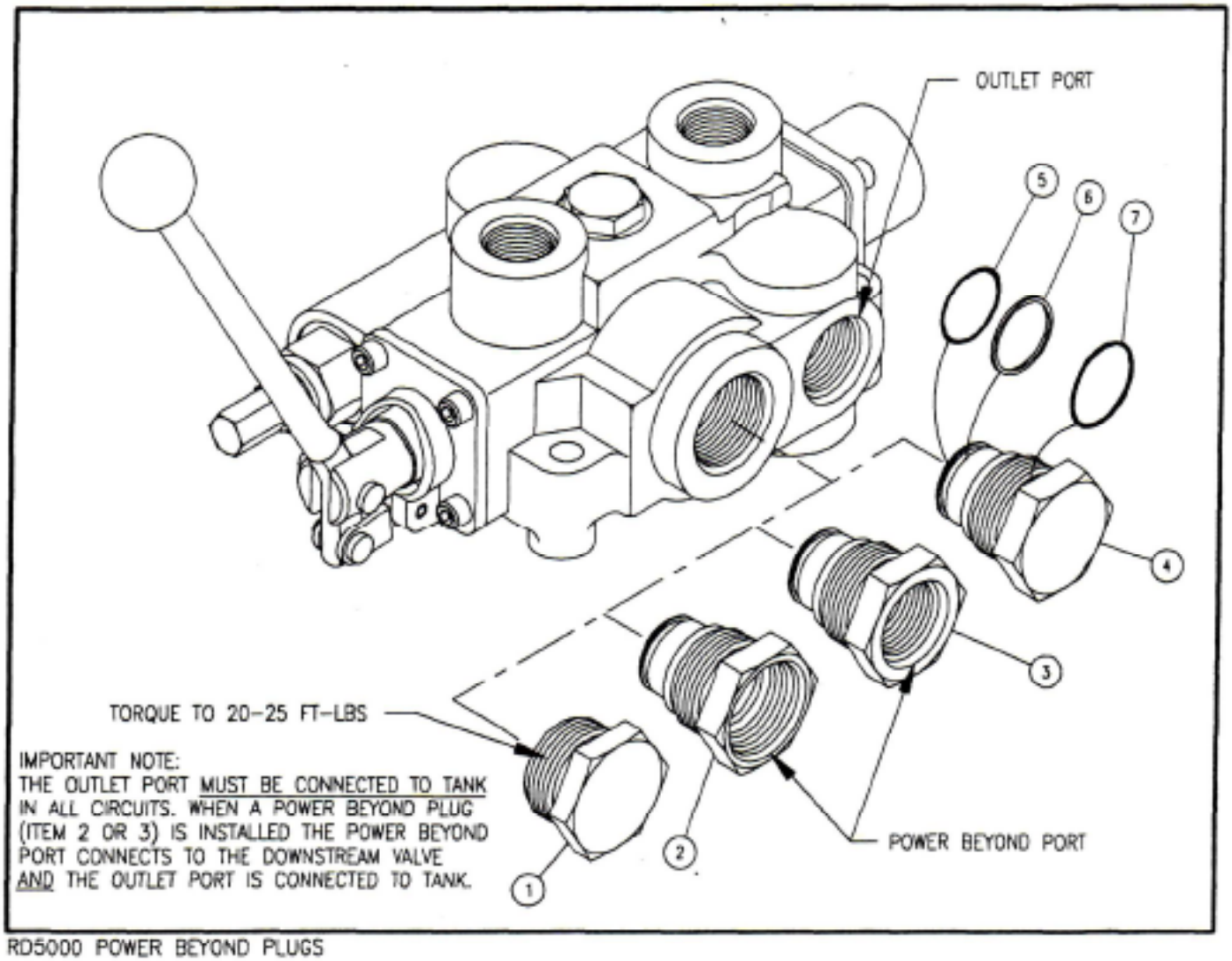
NOTES:
1. SEE SPOOL IDENTIFICATION CHART ON PAGES 7.
2. VALVES WITH 3 WAY SPOOLS HAVE 'A', 'C', OR 'E' WORK PORT PLUGGED.


RELIEF PRESSURE ON ITEMS 4 AND 5 CAN BE CHANGED BY REMOVING ACORN NUT AND JAM NUT, AND THEN TURNING ADJUSTING SCREW CLOCKWISE TO INCREASE PRESSURE AND COUNTER-CLOCKWISE TO DECREASE PRESSURE.
RELIEF PRESSURE ON ITEMS 2 AND 3 CAN ONLY BE CHANGED BY DISASSEMBLING, CARTRIDGE AND ADDING OR REMOVING SHIMS.
BACK-UP
O-RING
1
2
3
4
5
INSTALLATION TORQUE FOR ALL RELIEF CARTRIDGES 20-25 FT-LBS
WARNING: OVERPRESSURE MAY CAUSE SUDDEN AND UNEXPECTED FAILURE OF A COMPONENT IN THE HYDRAULIC SYSTEM RESULTING IN SERIOUS PERSONAL INJURY. ALWAYS USE A GAUGE WHEN ADJUSTING A RELIEF VALVE.

RD5000 RELIEF CARTRIDGES

RD5000 RELIEF CARTRIDGES

ITEM	QTY	PART NO. (UNTESTED)	DESCRIPTION	PRESET CARTRIDGE	SETTING
1	1	660250006	NO RELIEF PLUG (OPTION 1)		
2	1	660250005	SHIM ADJUSTABLE RELIEF 500-1500 (OPTION 2)	RV-ONL	1000 PSI
3	1	660250004	SHIM ADJUSTABLE RELIEF 1500-3000 (OPTION 3)	RV-ONH	2000 PSI
4	1	660250003	ADJUSTABLE RELIEF 500-1500 (OPTION 4)	RV-OL	1000 PSI
5	1	660250002	ADJUSTABLE RELIEF 1500-3000 (OPTION 5)	RV-OH	2000 PSI
		672000101	.015 SHIM		
		672000102	.033 SHIM		
		672000103	.060 SHIM		


OUTLET PORT
5
6
7
4
3
2
1
TORQUE TO 20-25 FT-LBS
IMPORTANT NOTE:
THE OUTLET PORT MUST BE CONNECTED TO TANK IN ALL CIRCUITS. WHEN A POWER BEYOND PLUG (ITEM 2 OR 3) IS INSTALLED THE POWER BEYOND PORT CONNECTS TO THE DOWNSTREAM VALVE AND THE OUTLET PORT IS CONNECTED TO TANK.
POWER BEYOND PORT

RD5000 POWER BEYOND PLUGS

RD5000 POWER BEYOND PLUGS

ITEM	QTY	PART NO.	DESCRIPTION
1	1	660312003	CONVERSION PLUG (OPTION B)
2	1	660312004	3/4 NPTF POWER BEYOND PLUG (OPTION C)
3	1	660312008	#12 SAE POWER BEYOND PLUG (OPTION F)
4	1	660312005	CLOSED CENTER CONVERSION PLUG (OPTION D)
5	1	240000020	020 O-RING
6	1	240005020	020 BACK-UP WASHER
7	1	240000916	916 O-RING

OPTION B STANDARD OPEN CENTER PLUG
This is the standard outlet option. This option allows for conversion in the field for power beyond or closed center applications. When the spools are in neutral the inlet is unloaded to tank.

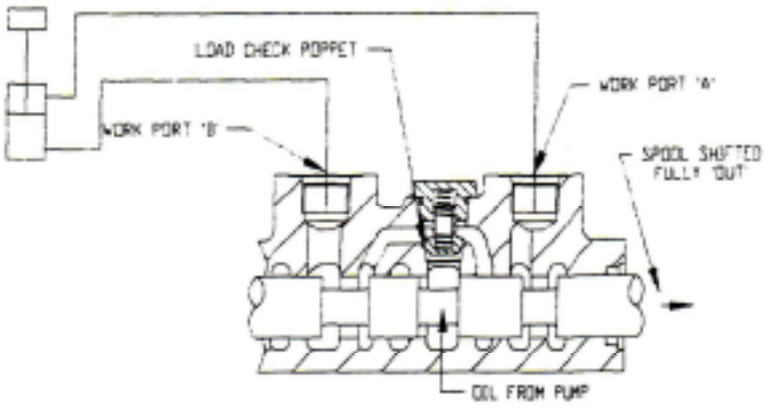
OPTION C AND F POWER BEYOND PLUG WITH 3/4 NPTF / #12 SAE
This option provides for a high pressure power beyond port. This would be used if a valve is to be added downstream. PLEASE NOTE The outlet must be connected to tank. When spools are in neutral the inlet is connected to power beyond port.

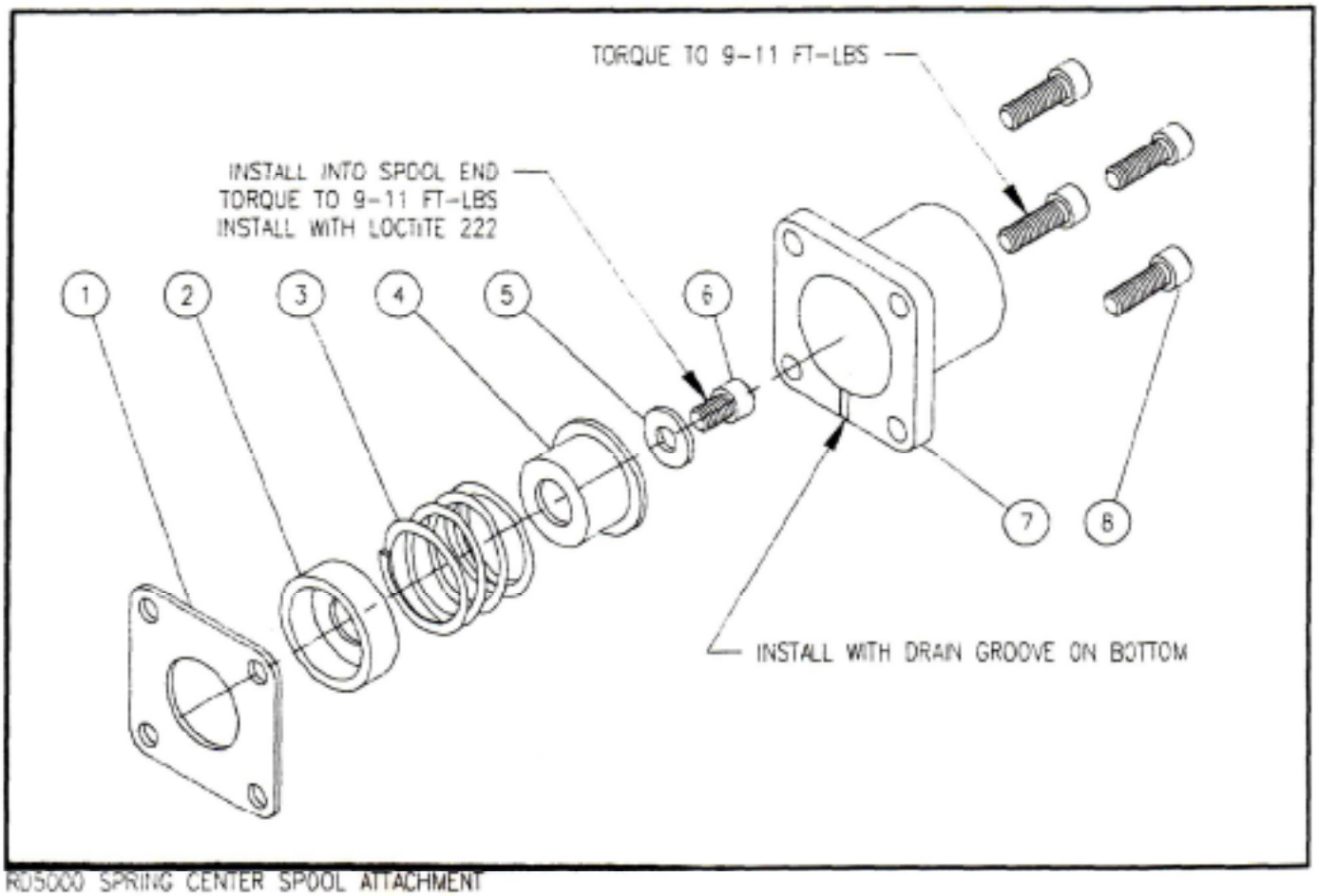
OPTION D CLOSED CENTER PLUG
This option provides for closed center operation. This is typically used with a variable displacement pressure compensated pump or in a system with an unloading valve. When the spools are in neutral the inlet port is blocked. The power beyond plugs can be used for closed center conversion by plugging the power beyond port.

LOAD CHECK DESCRIPTION:

The load check feature is standard on all RD5000 series valves. Each spool has a seperate load check. The load check will prevent the fall of a cylinder as the spool is shifted. It also prevents the backflow of oil from the work port to the inlet. As shown to the right, the pump must build up enough pressure to overcome the pressure on the work port caused by the weight of the load before the cylinder can move.

PLEASE NOTE that the load check has nothing to do with how well the valve will hold up a cylinder with the spool in neutral. The load check is functional only when the spool is shifted.



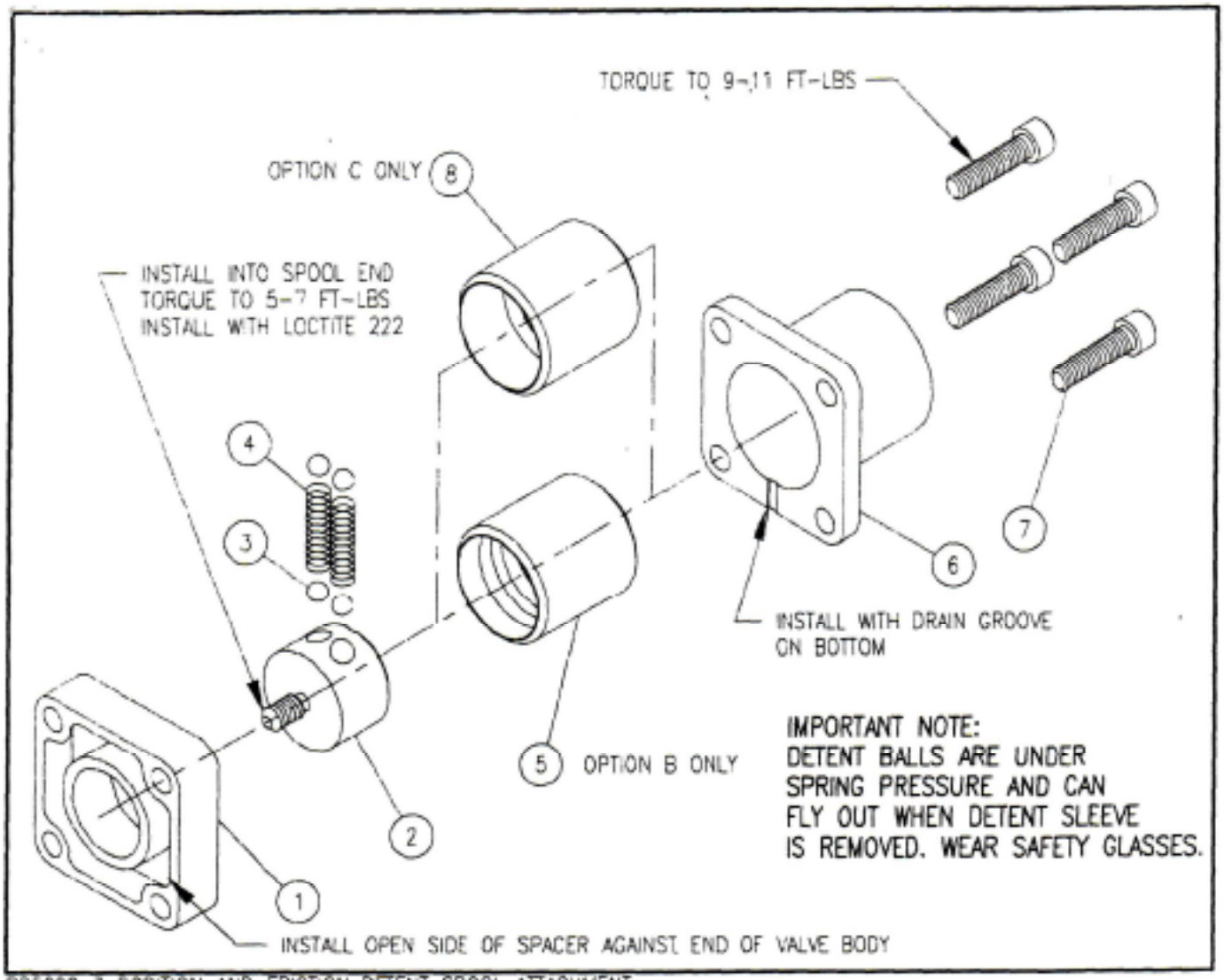


RD5000 SPRING CENTER SPOOL ATTACHMENT

RD5000 SPRING CENTER SPOOL ATTACHMENT (OPTION A)

ITEM	QTY	PART NO.	DESCRIPTION	
1	1	670500003	RETAINER PLATE	SPRING CENTER KIT NO. 660150001
2	1	671400001	STOP CUP (INNER)	
3	1	670300001	CENTERING SPRING*	
4	1	671400011	STOP CUP (OUTER)	
5	1	670500004	WASHER	
6	1	170003007	SOCKET HD. CAP SCREW	
7	1	670500005	END CAP	
8	4	170003008	SOCKET HD. CAP SCREW	

*STANDARD CENTERING SPRING CAN BE REPLACED WITH MEDIUM HAEVY SPRING PART NO. 670300047 OR HEAVY SPRING 670300043.



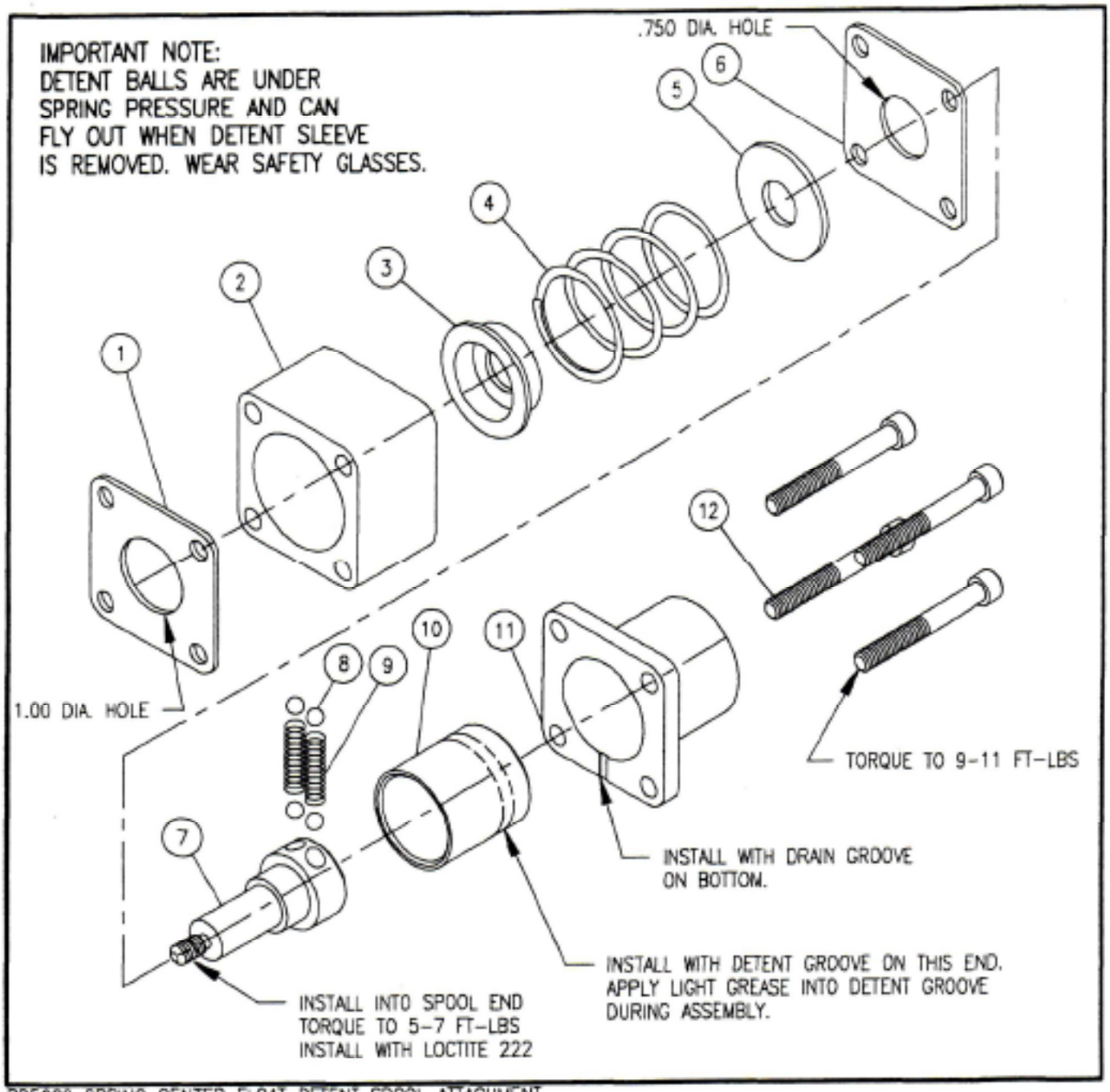
RD5000 3 POSITION AND FRICTION DETENT SPOOL ATTACHMENT

RD5000 3 POSITION DETENT SPOOL ATTACHMENT (OPTION B)

ITEM	QTY	PART NO.	DESCRIPTION	
1	1	671200002	DETENT SPACER	3 POSITION DETENT KIT NO. 660150002
2	1	670700008	DETENT ADAPTER	
3	4	230009009	STEEL BALL	
4	2	670300002	SPRING	
5	1	670700002	DETENT SLEEVE	
6	1	670500005	END CAP	
7	4	170003018	SOCKET HD. CAP SCREW	

RD5000 FRICTION DETENT SPOOL ATTACHMENT (OPTION C)

ITEM	QTY	PART NO.	DESCRIPTION	
1	1	671200002	DETENT SPACER	3 POSITION DETENT KIT NO. 660150003
2	1	670700008	DETENT ADAPTER	
3	4	230009009	STEEL BALL	
4	2	670300002	SPRING	
5	1	670700001	DETENT SLEEVE	
6	1	670500005	END CAP	
7	4	170003018	SOCKET HD. CAP SCREW	

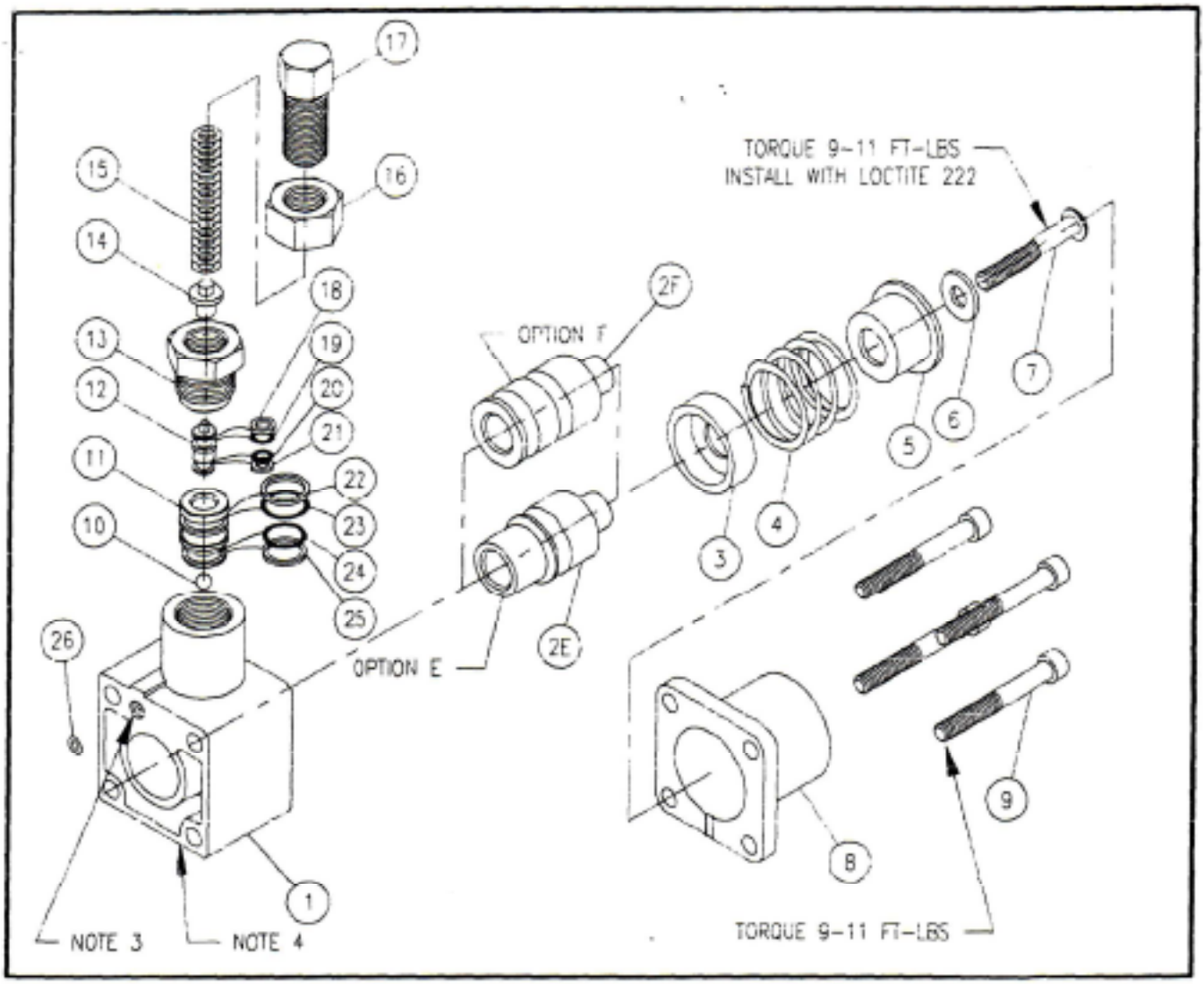


RD5000 SPRING CENTER FLOAT DETENT SPOOL ATTACHMENT

RD5000 SPRING CENTER FLOAT DETENT SPOOL ATTACHMENT (OPTION G)

ITEM	QTY	PART NO.	DESCRIPTION	
1	1	670500003	RETAINER PLATE	FLOAT HARDWARE KIT NO. 660150014
2	1	671200001	FLOAT SPACER	
3	1	670500007	STOP CUP	
4	1	670300003	FLOAT SPRING	
5	1	670500008	WASHER	
6	1	670500009	RETAINER PLATE	
7	1	670700007	FLOAT DETENT RETAINER	
8	4	230009009	STEEL BALL	
9	2	670300002	DETENT SPRING	
10	1	670700003	FLOAT DETENT SLEEVE	
11	1	670500005	END CAP	
12	4	170003019	SOCKET HD. CAP SCREW	

NOTE:
1. THIS CANNOT BE ADDED TO A VALVE IN THE FIELD. MUST BE USED WITH FLOAT SPOOL OPTION G.



RD5000 PRESSURE RELEASE DETENT OUT (OPTION E), AND IN AND OUT (OPTION F)

ITEM	QTY	PART NO.	DESCRIPTION
1	1	624890001	DETENT BODY
2F	1	670700005	SPOOL SLEEVE (OPTION F)
2E	1	670700004	SPOOL SLEEVE (OPTION E)
3	1	671400001	STOP CUP (INNER)
4	1	670300001	SPRING
5	1	671400011	STOP CUP (OUTER)
6	1	670500004	WASHER
7	1	220000954	CAP SCREW
8	1	670500005	END CAP
9	4	170003019	CAP SCREW
10**	1	230009009	STEEL BALL
11**	1	671100012	PISTON SLEEVE
12**	1	671100011	PISTON
13**	1	671600052*	RETAINER PLUG
14**	1	671100016*	SPRING ADAPTER
15**	1	670300033*	SPRING
16**	1	671600013*	JAM NUT
17**	1	671900016*	ADJ. SCREW
18**	1	240019008	008 BACK-UP WASHER
19**	1	240016068	O-RING

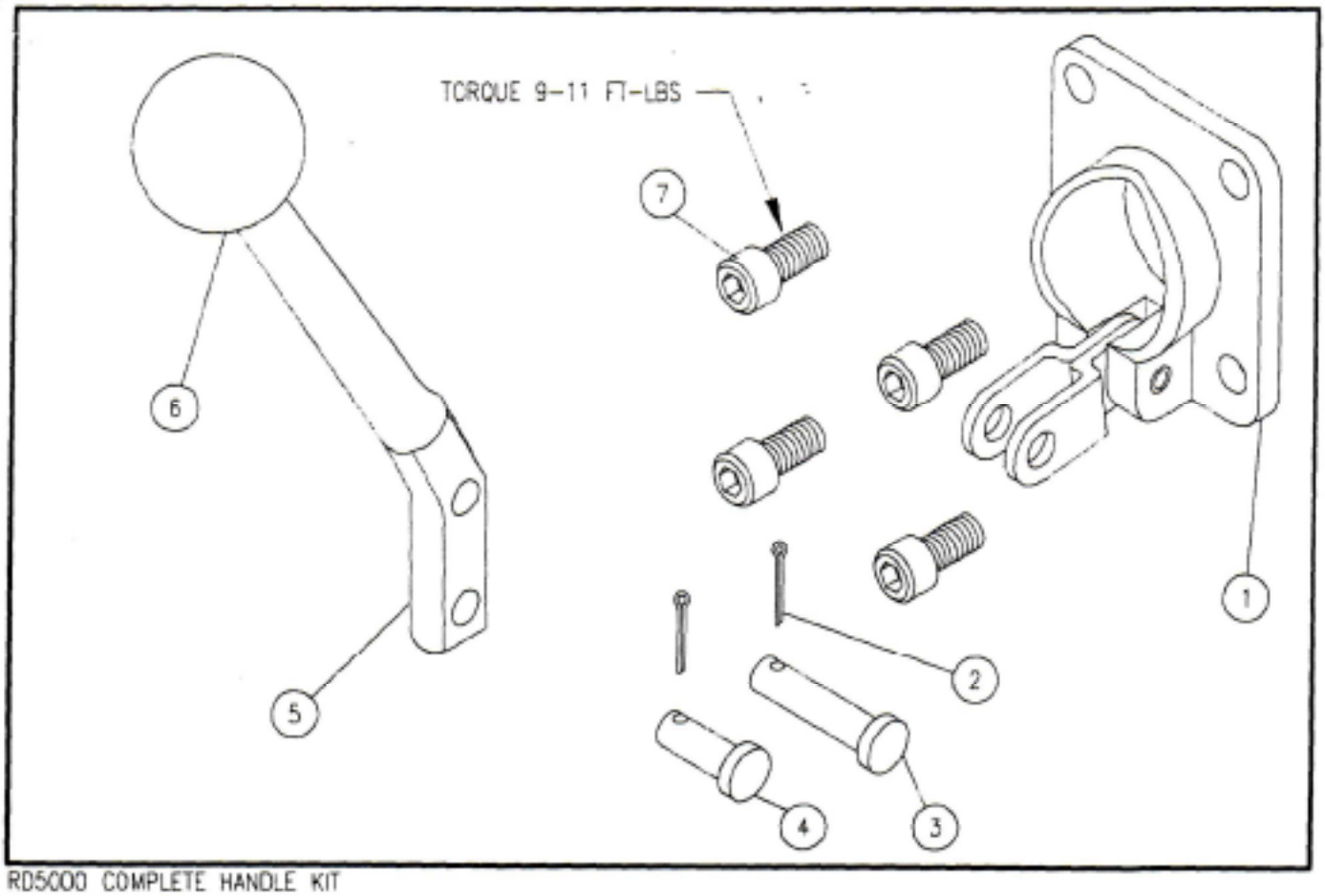
ITEM	QTY	PART NO.	DESCRIPTION
20**	1	240016067	O-RING
21**	1	240019007	007 BACK-UP WASHER
22**	1	240019014	014 BACK-UP WASHER
23**	1	240000014	014 O-RING
24**	1	240000013	013 O-RING
25**	1	240019013	013 BACK-UP WASHER
26	1	240000006	006 O-RING

**DETENT REPAIR KIT NO. 650130007

NOTE:

1. TO ADJUST DETENT RELEASE PRESSURE LOOSEN JAM NUT ITEM 16 AND TURN ADJUSTING SCREW ITEM 17 CLOCKWISE TO INCREASE DETENT RELEASE PRESSURE OR COUNTERCLOCKWISE TO DECREASE. DETENT PRESSURE IS ADJUSTABLE FROM 1000 TO 2000 PSI.
2. THESE OPTIONS CANNOT BE ADDED TO A VALVE IN THE FIELD.
3. THIS HOLE MUST LINE UP WITH THE PRESSURE HOLE IN THE END OF THE VALVE.
4. OPTION F IS MOUNTED HORIZONTALLY ON VALVE NOT VERTICALLY AS SHOWN.

*ADJUSTING CARTRIDGE NO. 660330002

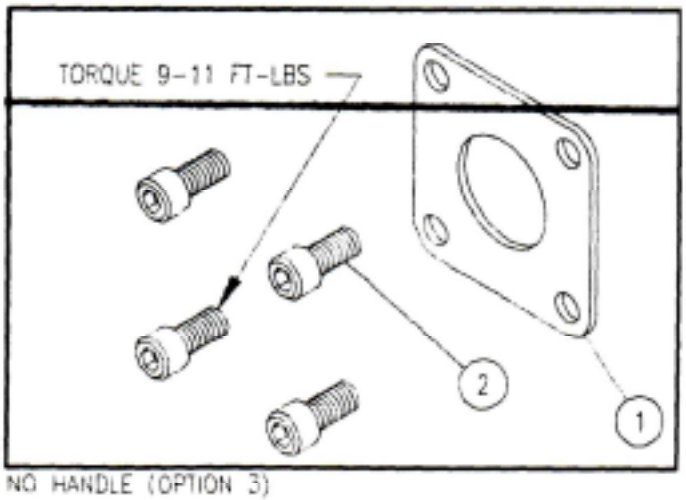


RD5000 COMPLETE HANDLE KIT

RD5000 COMPLETE HANDLE KIT (OPTION 1)

ITEM	QTY	PART NO.	DESCRIPTION		
1	1	660350001	CLEVIS SUB-ASSY		COMPLETE HANDLE KIT, NO. 660150039
2	2	220001512	COTTER PIN	HANDLE KIT NO. 660150004	
3	1	671700002	CLEVIS PIN		
4	1	671700001	CLEVIS PIN		
5	1	670400001	HANDLE		
6	1	670400002	KNOB		
7	4	170003017	CAP SCREW		

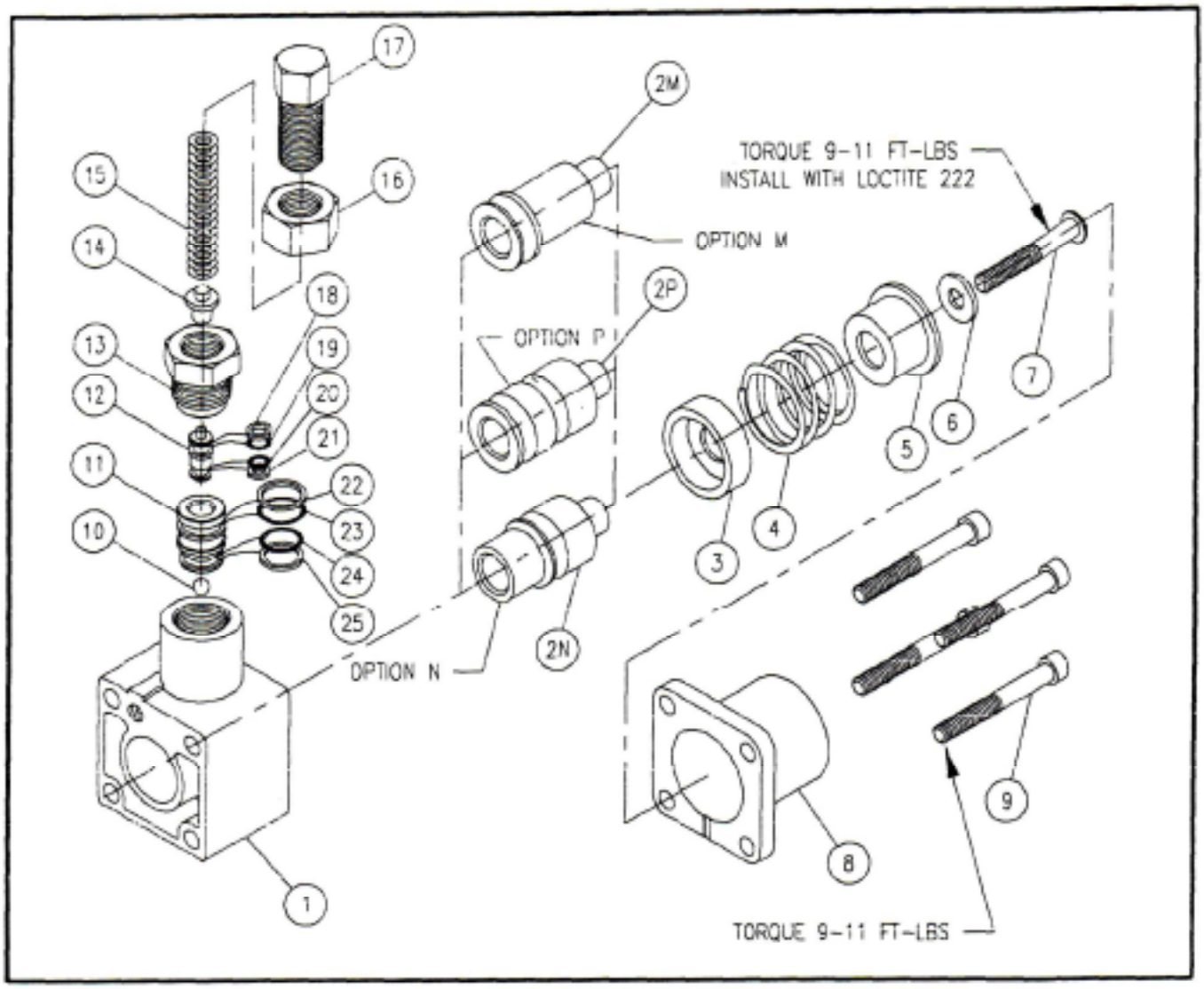
HANDLE OPTION 2 LESS HANDLE ONLY CONTAINS ABOVE PARTS LESS ITEMS 7 & 8.



NO HANDLE (OPTION 3)

NO HANDLE (OPTION 3)

ITEM	QTY	PART NO.	DESCRIPTION
1	1	670500003	RETAINER PLATE
2	4	170003017	CAP SCREW



SPRING CENTER DETENT IN (OPTION M), DETENT OUT (OPTION N), AND IN AND OUT (OPTION P)

ITEM	QTY	PART NO.	DESCRIPTION
1	1	624890001	DETENT BODY
2P	1	670700005	SPOOL SLEEVE (OPTION P)
2N	1	670700004	SPOOL SLEEVE (OPTION N)
2M	1	670700027	SPOOL SLEEVE (OPTION M)
3	1	671400001	STOP CUP (INNER)
4	1	670100001	SPRING
5	1	671400011	STOP CUP (OUTER)
6	1	670500004	WASHER
7	1	220000954	CAP SCREW
8	1	670500005	END CAP
9	4	170003019	CAP SCREW
10	1	230009009	STEEL BALL
11	1	671100012	PISTON SLEEVE
12	1	671100011	PISTON
13	1	671600052•	RETAINER PLUG
14	1	671100016•	SPRING ADAPTER
15	1	670300033•	SPRING
16	1	671800013•	JAM NUT
17	1	671900016•	ADJ. SCREW
18	1	240019008	008 BACK-UP WASHER
19	1	240016068	O-RING
20	1	240016067	O-RING
21	1	240019007	007 BACK-UP WASHER
22	1	240019014	014 BACK-UP WASHER
23	1	240000014	014 O-RING
24	1	240000013	013 O-RING
25	1	240019013	013 BACK-UP WASHER

OPTION M KIT NO. 660150023
OPTION N KIT NO. 660150018
OPTION P KIT NO. 660150020

NOTE:

1. TO ADJUST MANUAL DETENT HOLDING FORCE LOOSEN JAM NUT ITEM 16 AND TURN ADJUSTING SCREW ITEM 17 CLOCKWISE TO INCREASE HOLDING FORCE AND COUNTERCLOCKWISE TO DECREASE HOLDING FORCE. HANDLE FORCE TO MOVE SPOOL OUT OF DETENT SHOULD BE APPROXIMATELY 4-5 LBS.
2. APPLY LIGHT COAT OF GREASE TO ITEMS 18-25 DURING ASSEMBLY.

•ADJUSTING CARTRIDGE NO. 660330002

PAGE 1 OF 2

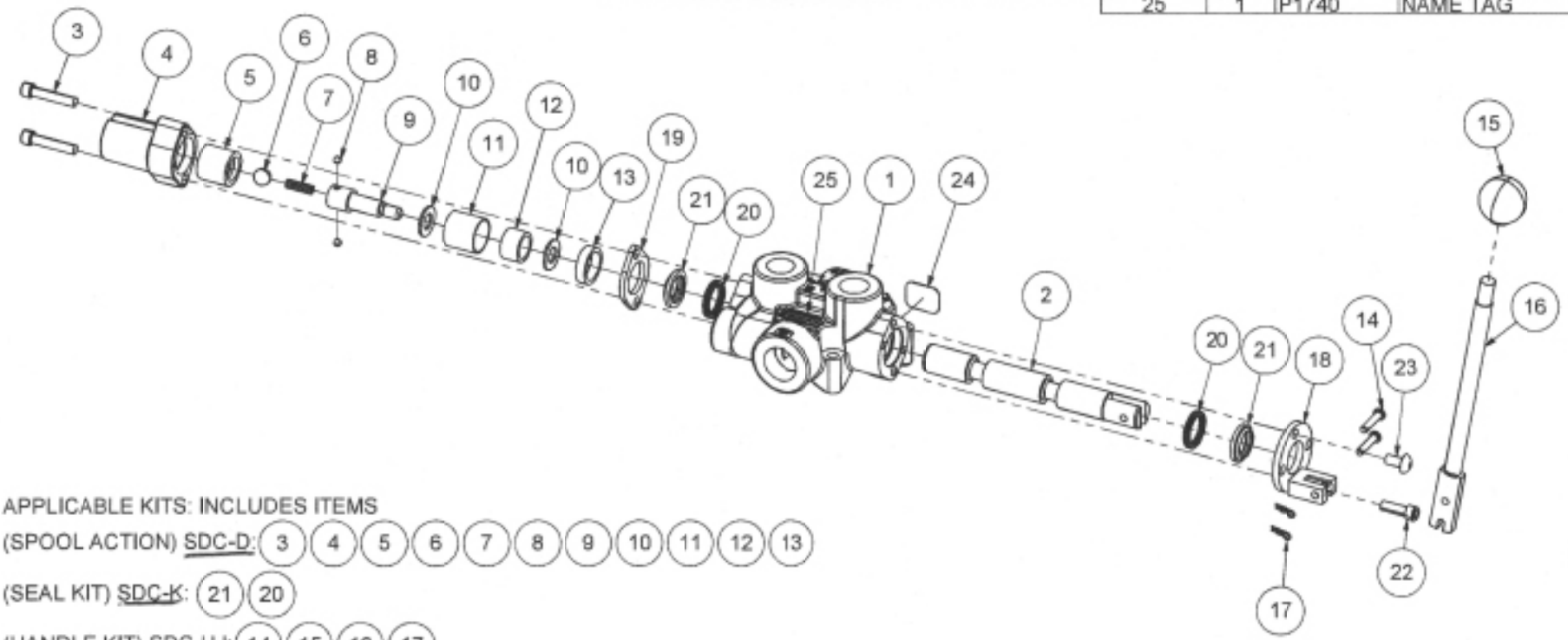
NOTES:

USE 242 (BLUE LOCTITE) ON ITEMS (3)

(9) (23) (22) WHEN ASSEMBLING.

ITEM NO.	QTY.	P.N.	DESCRIPTION
1	1	AOCAST	AO CASTING
2	1	SF303C4J	SPOOL
[redacted]			ALLEN SCREW
			ENDCAP
			DETENT SLEEVE
			7/16 BALL
			SPRING
			3/16 BALL
			HOUSING
			WASHER
			SPACER
			SPACER

ITEM NO.	QTY.	P.N.	DESCRIPTION
[redacted]			
18	1	SF377	CLEVIS BRACKET
19	1	SF306	RETAINER
[redacted]			QUAD RING
22	1	SF308	CAP SCREW
23	1	HP5	BUTTON SCREW
24	1	P1654	WARNING TAG
25	1	P1740	NAME TAG



APPLICABLE KITS: INCLUDES ITEMS

(SPOOL ACTION) SDC-D: (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13)

(SEAL KIT) SDC-K: (21) (20)

(HANDLE KIT) SDC-HJ: (14) (15) (16) (17)

REV.	DATE	DESCRIPTION

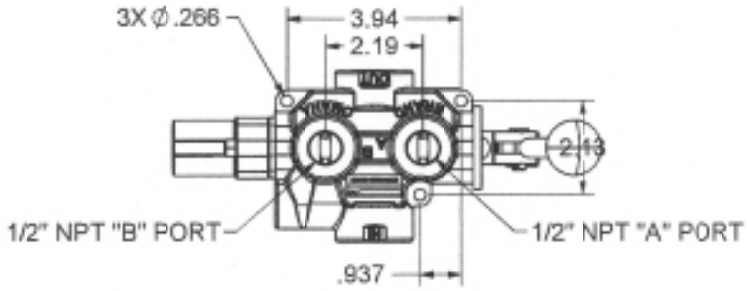
XXXXXXXX HYD VALVE (550A SN:186+/ 950A SN: 140+)

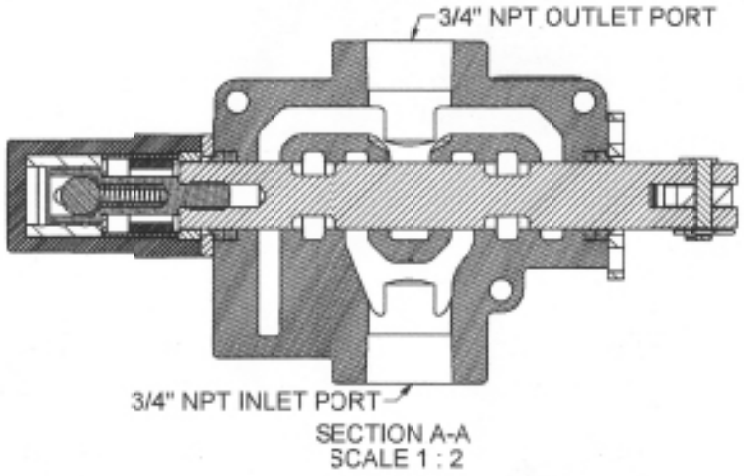
TITLE: VALVE, AO
NPT PORTS, CLOSED, J HANDLE, DETENT

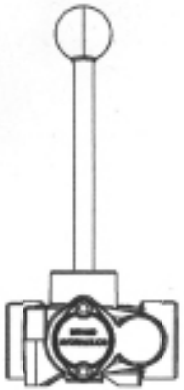
MATERIAL: -

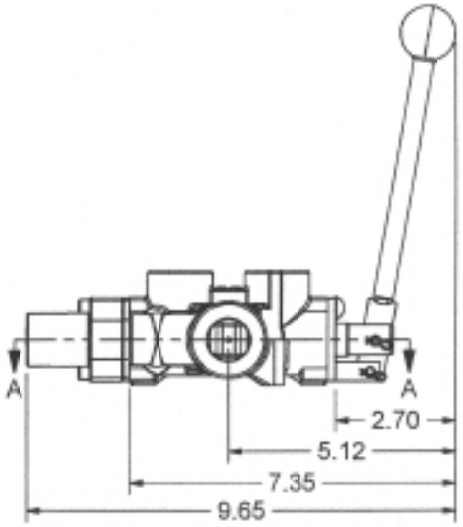
STANDARD TOLERANCE
UNLESS NOTED:
0.00 ± 0.010 (0.015 GCI)
0.000 ± 0.005 (0.010 GCI)
◎ = .005 TIR
FRACTION ± 1/32
ANGLE ± 2°
DIMENSIONS ARE IN INCHES

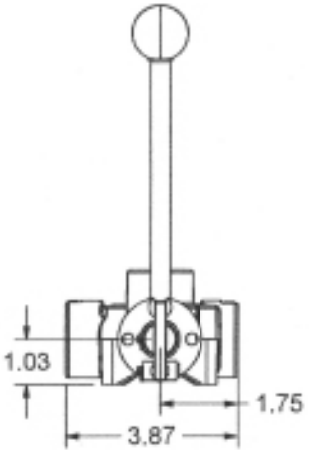
PART NO: 031-25valve-a

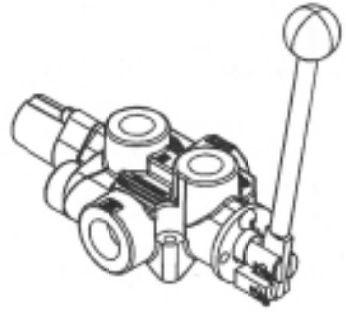












HYD VALVE (550A sn:186+/ 950A sn: 140+

TITLE: VALVE, AO NPT PORTS, CLOSED, J HANDLE, DETENT	MATERIAL: -
STANDARD TOLERANCE UNLESS NOTED: 0.00 ± 0.010 (0.015 GCI) 0.000 ± 0.005 (0.010 GCI) ◎ = .005 TIR FRACTION ± 1/32 ANGLE ± 2° DIMENSIONS ARE IN INCHES	PART NO: 031-25valve-a